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The Relationships of Word Processing in Academic Work and Student Achievement Scores on the National Assessment of Educational Progress

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THE RELATIONSHIPS OF WORD PROCESSING IN ACADEMIC WORK AND STUDENT ACHIEVEMENT SCORES ON THE NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

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THE RELATIONSHIPS OF WORD PROCESSING IN ACADEMIC WORK AND STUDENT ACHIEVEMENT SCORES ON THE NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

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ABSTRACT

THE RELATIONSHIPS OF WORD PROCESSING IN ACADEMIC WORK AND STUDENT ACHIEVEMENT SCORES ON THE NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

By

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Dissertation supervised by Dr. Carol Parke

This study is a secondary analysis of the 2011 NAEP writing test investigating the relationships between word processing in academic work and achievement test scores. Using data and methods to overcome several of the limitations found in research surrounding instructional technology, the statistical analyses constructed a table of z–scores and p-values that describe the relationship between both general use and specific uses of word processors and the total score on the NAEP writing assessment. Heuristic analysis of this table finds that there is a persistent and positive relationship between the use of word processors and writing achievement score. Specifically, the use of the backspace key, using word processors to make changes to a paper, using word processors to complete writing started by hand, and using the thesaurus function included in word processors are strongly related to achievement score. Further, the interactions of

composition, editing, and revision are more complex that previously thought and may be growing as students comfortable with a new generation of technology continue to break the paradigm of the writing process. Finally, this study explores a new relationship between small edits and measuring the quality of writing by suggesting that word processors make the purpose of edits more important that simply the size of the edit.

DEDICATION

To my wife, Diahnne, who wouldn't let me give up.

To my kids, Amelia, Gideon, Oliver, and Elliot—four excellent reasons for doing anything.

To my parents, Robert and Barbara Glenn, for their tireless encouragement since Kindergarten.

To my sister, Elly, for teaching me statistics when no one else could.

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Chapter 1:

Introduction

In 2011, New York City's Department of Education increased its instructional technology spending in K-12 schools by over one half billion dollars. In the same year, it cut over one billion dollars from its budget for school construction and eliminated more than 6000 jobs in response to a drop in state financial aid (Otterman, 2011). In explanation of this significant shift in budgeting, a deputy chancellor at the Department of Education, John White, said, "If we want our kids to be prepared for life after high school in the 21st century, we need to consider technology a basic element of public education" (Otterman, 2011, para. 10).

Mr. White's statement is based on a belief that instructional technology improves education as well as other aspects of life. He is not alone in this belief. Around the world, $3.6 trillion was spent on information technology in 2013 ("IT Spending Report" n.d.). Even in the face of global financial crises and economic slowdowns, information technology spending is projected to increase by about 3% annually until 2017, when total spending is expected to reach $4.3 trillion ("IT Spending Report" n.d.). Across the nation, money is being shifted into the adoption and growth of technology of all sorts.

Instructional technology is an important part of this growth. School districts, states, and the federal government continue to aggressively invest financial and emotional resources into instructional technology. This in turn has redoubled interest in questions about the impact of instructional technology on teaching and learning. Leaders on all levels of education and government are anxious to see if and how their investments are paying off (Gosmire & Grady, 2007; Richtel, 2011).

With so many resources at stake, educational researchers need to produce high quality data analyses to justify investment in instructional technology, including word processors, or to advocate shifting those resources to worthier endeavors (Richtel, 2011). As in New York, education decision-makers across the nation have bet their students' futures on the ability of instructional technology to improve K-12 education. Many influential scientists, educators, and politicians have faith that instructional technology will transform education, citing that the "level of activity and creativity in the world of educational and learning technology illustrates its tremendous potential" while acknowledging that "technology has had only a modest impact on the K-12 classroom to date" (President's Council of Advisors on Science and Technology, 2010, p. 77). This set of beliefs, even if relatively unfounded in data, has been the driving force behind the expansion of investment in instructional technology.

Not everyone shares this faith in the promise of instructional technology. Unlike New York City, Texas responded to significant reductions in revenue by cancelling $135 million in grants for instructional technology as part of a $4 billion reduction in regular state funding for public schools (Stutz, 2012). These cuts are in part the result of a different set of beliefs, that evaluations of learning are not aligned with skills promoted via instructional technology. For some, the question of the effectiveness of instructional technology is moot until there is some connection between investment in instructional technology and increasing test scores. Only 41 percent of K-12 school leaders believe instructional technology helps raise student test scores, including leaders in districts where instructional technology budgets are increasing (Stutz, 2012). Apparently, a majority of K-12 school leaders in Texas think that continued investment in instructional

technology is misplaced as long as the criteria for successful investment outcomes is rising test scores. In a climate of school and teacher accountability where student learning is measured by student performance on standardized tests, it is not surprising to see instructional technology budgets cut when there is a lack of data linking instructional technology to student achievement in K-12 schools.

The confusion resulting from a lack of convincing evidence regarding the impact of instructional technology is well illustrated by the experiences of the Arizona school district of Kyrene, which serves 18,000 elementary and middle school students around the cities of Tempe, Phoenix and Chandler (Richtel, 2011). In 2005, the district leadership convinced voters to approve a new tax to allow the district to invest heavily in instructional technology in a bid to transform their classrooms and shore up a declining student population. In 2012, the district went back to voters and asked for an additional $46.3 million over seven years—five times as much money as the district spends on textbooks—to continue their instructional technology improvement plans. Voters, leaders, and even teachers questioned the need for this level of investment, in effect making this vote a sort of referendum on the idea that instructional technology improves education. Unfortunately, mainly due to a lack of quality evidence, these are questions the school district could not answer: "My gut is telling me we've had growth," says Superintendent David Schauer, "But we have to have some measure that is valid, and we don't have that… We've jumped on bandwagons for different eras without fully knowing what we're doing. This might just be the new bandwagon. I hope not" (Richtel, 2011, para. 27).

The entire field of education may be, as the faithful believe, at the "inflection point for a bolder transformation of education powered by technology," as the U.S Department of Education claims (U.S. Department of Education Office of Educational Technology, 2010, p. 11). Even if so, the continuing investment in instructional technology necessary to make such a transformation possible requires clear and convincing answers to questions of if and how instructional technology improves student learning and student performance. To justify continuing investments in instructional technology, school leaders must be able to answer these basic questions with clear and convincing, as well as representative and valid, data.

Unfortunately, the research program necessary to answer these questions has not been able to keep up with the relentless pace of technology innovation and investment. Authors have noted how changes in instructional technology can happen during the time it takes to publish a book on instructional technology (Coiro, Knobel, Lankshear, & Leu, 2008). The frustration with the state of instructional technology research was well expressed by Tom Vander Ark, the former executive director for education at the Bill and Melinda Gates Foundation in an article in the New York Times (Richtel, 2011). He is reported to have said, "The data is pretty weak. It's very difficult when we're pressed to come up with convincing data… We better put up or shut up" (Richtel, 2011, para. 11). As with so many tools and theories in the field of education, the usefulness of instructional technology in classrooms has become "common knowledge" in the educational community without the data that should found such ideas. In an era when schools and teachers must demonstrate how they are raising student achievement, leaders cannot afford to invest in any methods not based on substantial research.

Word Processing

This is as true in the area of research into the use of word processors in schools as anywhere else. Word processing was one of the first, and arguably is the most deeply entrenched, instructional technologies adopted in schools. For this reason, the study of word processing software in schools can be a valuable avenue of study into the use and results of instructional technology in K-12 schools. Clear answers to questions surrounding the use of word processors in academic work can serve as a solid foundation for answering other questions about the impact of instructional technology on learning.

Word processing is not too new and not too old. Word processing can seem to be outdated in terms of instructional technology and thus of little use in research. The most recent popular topics of research in this field include "new media" or "multimodal" writing, as can be seen in the special issue of Computers and Composition published in 2014 called "Multimodal Assessment" (Whithause, 2014). A closer look, however, reveals that the purposes of much of the research into these newer topics are very different from those of this research involving word processors. For example, in the "Letter from the editor" from the special issue mentioned above, Whithause describes the nature of such research thusly:

> Despite the divergent perspectives in the books review, Boston et al. find an important question echoing through all the works—'How do we integrate multimodal composition into broader writing program learning outcomes?' It is indeed the point of this special issue to explore the ways in which the composition studies community is beginning to answer this question. (Whithaus, 2014, p.viii)

Research into multimodal composition is important to the future of writing instruction and the use of instructional technology, but the current research questions involve the development of assessments (Yancey, 2004). Because these new technologies break or dramatically change the traditional writing process, it is difficult to use the assessments based on the traditional writing process (Sorapure, 2004). New assessments need to be developed in order to better study these new media.

Conversely, there is significant agreement on how to assess word processing-based composition (Applebee, 2005). Where new media-based writing is struggling to be integrated into an assessment framework, word-processing has been successfully integrated already, as it was in the Writing Framework developed for the 2011 National Assessment of Educational Progress (National Assessment Governing Board, 2010b).

This study is not about the development of assessments, but about the use of valid assessment instruments to answer questions regarding the use of instructional technology generally and word processing specifically. Instructional technologies that work outside the traditional writing processes, often called "new media," are inappropriate for this study. Word processing is an instructional technology that is old enough to have a mature set of assessment instruments.

On the other hand, even if word processing is not considered to be too new, perhaps it should be considered to be too old, that is, there has been enough time since the introduction of word processing as an instructional technology for the question of effectiveness to be answered. There is a significant accumulation of literature, growing as the use of word processors in schools spread. Nevertheless, even a brief review of the literature will conclude that the question is—at least from an educational research point

of view—very open to debate. Over the past two decades, more than 200 studies have examined the impact of word processing on student writing (Goldberg, Russell, & Cook, 2003). What may seem like an encouraging statistic starts to look hopelessly out of date when more than half of these studies were conducted prior to the development, much less wide-scale use, of menu-based word processing software. Even a meta-analysis of this research published in 2012 includes only 27 studies, 66% of which were published before 1995, none were published after 2005, and less than half appeared in refereed journals (Morphy & Graham, 2012). The majority of these studies looked at stand-alone word processing machines, technology that shares only basic characteristics with what in 2014 is usually meant by word processors. In addition, the students serving as the subjects of these early studies were much less accustomed to working with computer technologies compared to students in the second decade of the new millennium (Goldberg et al., 2003). Unlike the word processors themselves, the data is outdated and outmoded and cannot possibly answer the questions being asked by school leaders, like those mentioned in New York, Texas, and Arizona, who are struggling find the best ways to invest in education. This study explores the relationships involving computer-literate students and well-developed word processing software.

Additionally, several authors have pointed out the informal, unorganized, and even amateurish nature of so much of the research in this area (Carole & Louth, 1988; Dave & Russell, 2010; Goldberg et al., 2002; Li & Ma, 2010). For this reason, not only must this new relationship between computer-literate students and well-developed word processors be fully explored, but the research must also be done with appropriate and

accepted methods using high quality data, that is, data collected with valid instruments from unbiased and representative samples.

Purpose of Study

The ability to write well in a digital environment is essential to a student's success in school and beyond (Hawisher, Selfe, Moraski, & Pearson, 2004). The purpose of this study is to use high quality, convincing data to further the exploration of the relationships between the use of instructional technology in schools and student achievement. This is done specifically in this study by an investigation of relationships between (1) the use of word processers, one popular and widespread form of instructional technology used in schools, and (2) students' scores on the writing content portion of the National Assessment of Educational Progress, one of the largest and most validated standardized tests of United States students' knowledge and skills (National Center for Educational Statistics, 2009).

This study intends to answer the following questions:

- To what extent is there a relationship between the level at which students use word processors in school and student achievement scores on the writing portion of the National Assessment of Educational Progress?
- What, if any, stated uses of word processers appear to correlate with higher student achievement?

The results of this study will be able to provide clear empirical evidence which can guide policymakers and educators towards good decisions in issues surrounding word processing as an instructional technology in schools.

To answer these questions, first the phrase "student use of word processors" is operationalized as a combination of several behaviors, each associated with a variable defined and measured by the National Assessment of Educational Progress. These behaviors, described fully in the Method chapter, include actions like "use the paste function" or "use a word processor to finish a paper started by hand" (National Center for Educational Statistics, 2009). Using this operationalized definition, a student can be said to be on one of two levels in the use of word processors in school: "high use" and "low use." How these two groups of students differ can indicate how a number of things are related to different levels of word processor use. Since this study is interested the relationship between academic achievement and level of word processor use, it will compare the scores on an achievement test of the high use group with the scores on the same test of the low use group. This comparison will suggest how achievement scores and the level of student use of word processors may be related.

To clearly differentiate the subject of this study from previous literature, word processors are here defined as computer applications that allow a computer user to create, edit, and format text with a keyboard and graphical user interface, and supplies tools to enhance the user's ability to edit and format text (e.g., cutting, pasting, and spell check). The term includes full-featured office suites (e.g., Microsoft Word), more focused online applications (e.g., Google Docs), and even more limited uses such as web-based WYSIWYG editors used within larger web applications (e.g., TinyMCE). The term excludes electronic typewriters, stand-alone machines, and simple text editors.

Methodological Strengths

The dataset. Two features of this study address the methodological weaknesses often found in the literature and contribute to the quality of the evidence it will produce: the dataset and the statistical methodology. First, the data to be analyzed comes from the National Assessment of Educational Progress (NAEP), also called the Nation's Report Card. Using this dataset overcomes several of the most common methodological weaknesses noted by many authors (see O'Dwyer, Russell, Bebell, & Tucker-Seeley, 2005; Waxman, Lin, & Michko, 2003; Zvacek, 1988) including: (a) studying only a small number of subjects; (b) the assessment of a single, commercial word processing product; and (c) the lack of validation of instruments created by the researchers themselves. In contrast to these weaker studies, NAEP (a) includes about four percent of all students across the United States, or hundreds of thousands of subjects; is (b) ignorant of the specific instructional technology employed by any given student while gathering clear information on how and when word processors are used; and (c) NAEP instruments are rigorously tested by the American Institutes for Research's NAEP Validity Studies panel to ensure these instruments are as valid, reliable and free of bias as possible ("National Assessment Governing Board Overview," n.d. ; "NAEP Validity Studies Panel," n.d.).

Subpopulations. Second, this study will collect data across many subpopulations of students. All research into the use of word processors in schools, including this study, has necessarily been observational rather than truly experimental—the subjects cannot be randomly assigned to treatment and control groups. The result of non-random assignments is the confounding of variables to one degree or another, weakening the study's ability to draw causal conclusions (Cochran & Chambers, 1965). Though this

limitation also keeps this study from seeking to expose logical cause and effect relationships between the use of word processors in academic work and higher achievement scores, it can reveal possible relationships between patterns of specific ways of using word processors and patterns of student achievement scores. The result will be clearer insights into the modern use of word processors in academic work as well as evidence-based suggestions for more specific research questions for future studies that may reveal more causal relationships.

Chapter 2:

Review of the Literature

"We cannot survive on the random story anymore." (Linda Roberts, Office of Educational Technology at the U.S. Department of Education, in McNabb, Hawkes, & Rouk, 2000, p. 8)

The History of Research in Instructional Technology and Writing Education

Always looking for ways to improve learning, the educational community began investigating word processing as an instructional technology early in technology's development. One of the first in the field, the journal Computers and Composition was first published in 1983. In the early years of that journal, teachers and researchers expressed the belief that computer-based writing had the potential to improve the quality of student writing (Moran, 2003). The editors of that journal objected to the "uncritical enthusiasm" and the persistent writing of the "laudatory influence of computers" pervasive through their journal and others, and successfully worked to improve the field's ability to write critically (Hawisher & Selfe, 1991, p. 56). Though the exact mechanism for how it might happen was not clear, the connection between word processors and improved quality of writing was regularly assumed (Brownell, 1985; Hawisher & Selfe, 1991; Roth, 1984; Sommers, 1984). The rhetoric of technology used in writing was one of hope, vision and persuasion (Hawisher & Selfe, 1991).

Large-scale investigation into instructional technology began in 1986 when the U.S. Congress instructed the Office of Technology Assessment (OTA) to assess the use of instructional technology in U.S. schools. Over the next decade, the OTA documented

national patterns of instructional technology integration and use in schools (U.S. Congress, Office of Technology Assessment, 1988, 1989, 1995).

Early Evidence Supporting the Use of Word Processors. Throughout the 1980s, hundreds of formal and informal studies documented the positive effects of learning with computers, including more highly developed thinking skills, stronger problem solving skills, higher-order understanding, greater enjoyment, and learning in shorter periods of time (O'Dwyer et al., 2005). Not all results were positive, but even when no improvement was found in the finished product, positive effects of word processors were reported, especially in the writing process (Daiute, 1986b; Dave & Russell, 2010; Hawisher, LeBlanc, Moran, & Selfe, 1995; Hawisher, 1988). In their history of computers in the teaching of writing, Hawisher et al. (1995) called this period "Growth and Enthusiasm" followed by "Emerging Research and Professionalism" to describe how the unbridled growth of interest and expectations of bring computers into the writing classroom changed into more professional attitudes excited by the prospects of computers but without the expectation of a panacea.

In the first significant quantitative meta-analysis of word processing and writing in elementary schools, Cochran-Smith (1991) found that students of all ages had positive attitudes toward word processing, were able to master keyboarding strategies for use in age-appropriate writing activities, and that students who used word processors spent more time writing and produced slightly longer, neater, more technically error-free products than when using paper and pencil. This meta-analysis, however, also indicated that word-processing, in and of itself, generally did not impact the overall quality of student writing (Cochran-Smith, 1991).

Just a few years later, similarly positive results were found by Bangert-Drowns (1993) in a meta-analysis of 28 studies using students spanning from elementary to post-secondary schools. Close to two-thirds of these studies found that word processors gave students an advantage over other writers; the meta-analysis indicated that using word processors contributed to a modest but consistent improvement in the quality of student writing (Bangert-Drowns, 1993).

Mixed Results. By the mid-1990s, schools were looking to take advantage of the increase in reliability, affordability, and usability of a new generation of computers (based on several technological advances at that time—especially Intel's Pentium processor and Microsoft's Windows 3.1) to make computers more available to students and teachers (Bebell, Russell, & O'Dwyer, 2004; Latif, n.d.). Hawisher et al. (1995) named this stage the "Coming of Age" of the computer in the writing classroom since research was beginning to consider broader issues and teachers were becoming more comfortable using computers.

At the same time, it was becoming clearer that the relationship between word processors and student writing is more complex and less dramatic than previously believed. In 1994 for example, Dowling (1994) integrated research on seven different types of writers to conclude the following:

> To claim simply that the advent of word processing has made writing easier is to ignore the many and often subtle ramifications of the special characteristics of the computer-mediated writing environment that conspire to render at least some of the apparent benefits illusory for particular writers. (p. 234)

Similarly, Crafton (1996) found basic writers lacking in computer skills encounter significant difficulties when writing in a computerized environment.

Around the same time, however, Collins (1990) found learning disabled students to be less anxious about writing when given a word processor, and Batschelet and Woodson (1991) found basic writing students felt positive about writing on computers even though there was no improvement in their attitude towards the writing process itself. Others found a wide range of reactions from basic writers when introduced to word processing (Nichols, 1986).

There are three large-sample studies of the relationship between instructional technology and student achievement using standardized measures. Comparing the results of these three studies yields a mixed message. Mann et al (1999) found positive effects in a study of 950 students in 18 schools; Wenlingsky (1991) included over 4,000 students and found mixed effects, depending on how the technology was used; and Angrist and Lavy (2002), which also included over 4,000 students, found no effects or negative effects for different subject areas. Together, these studies reveal the question of the relationship between word processing and changing student achievement to be more complex than earlier researchers had assumed. The mixed results of these studies illustrate the need to define terms and control variables before real progress in answering these questions can be made (Cheung, 2012). These lessons also caused some to question the positive results of earlier research.

Later Criticism. Significant criticism of these early positive results began in the later years of the 1990s and grew through the following decade. In 1995, Collier and Werier published a study where proficient writers who used word processors were asked

to compose by hand, concluding, "Good writers are good writers, no matter how they write" (Collier & Werier, 1995, p. 56).

Larry Cuban, one of the more well known skeptics, argued that computers were just one more example of schools forcing teachers to use new and unproven technologies in the classroom (Cuban, 1986). He places computers in the same category as Thomas Edison's moving pictures, B. F. Skinner's teaching machines, video tape, and cable TV—all technologies that failed to live up to the popular belief that they would change the face of education (Cuban, 1986). Cuban would go on to analyze the findings of many studies and conclude that the effects of computers in the classrooms have been significantly overstated (Cuban, 2001).

Other authors even argued that computers have a negative effect on the social, emotional, and physical health of children (Cordes, Miller, & Alliance for Childhood, 2004; Healy, 1999). Oppenheimer (1997, 2003) recounted anecdotes of simple, mindless, and repetitive tasks that would never have been accepted by educators if they had not been done on computers.

At the close of a conference sponsored by the U.S. Department of Education in 1999, the following was reported:

> Parents and teachers, school boards and administrators, governors and state legislatures, and Congress all want to know if the nation's investment in technology is providing a return in student achievement. Indeed, if resources are to be expended on technology, it is becoming a political, economic, and public policy necessity to demonstrate its vital effectiveness. (Mcnabb, Hawkes, & Rouk, 2000, p. 1)

At the turn of the century, 20 years into the research program investigating the relationship between word processors and student achievement, all major stakeholders in elementary education believed that the question remains unanswered. Much of the earliest research is disregarded as the more recent research calls those results into question by both demonstrating the complex nature of the question and showing how previous studies were too simplistic to shed much light on the topic.

Weaknesses of Previous Studies

To rigorously study the impact of instructional technology integration in classrooms, a study must address the limitation of so many previous studies. Cheung (2012) places the blame for a literature filled with mixed results squarely on the poor methods too often employed by researchers studying the effects of word processors on writing quality.

Lack of quality. Similarly, after their meta-analysis of almost 200 studies published between 1997 and 2003 was fairly inconclusive, Waxman, Lin, and Michko (2003) commented on the state of research on instructional technology and achievement, saying, "the lack of quality, refereed quantitative studies points to a serious problem of research in the field" (p.13). In their analysis they identified several areas of weakness: the general lack of quality, poor methods of data collection, inconsistent measurement of outcomes, and the lack of clear or standardized definitions.

Waxman, Lin, and Michko (2003) point to the difficulty in finding studies to be included in a meta-analysis as the first evidence of the literature's general lack of quality. Of the almost 200 studies published in those six years covered by the meta-analysis, only 42 met the standard for inclusion in the meta-analysis itself. This same trend was found in

earlier research when Ouyanf (1993) rejected 48 of the 169 studies gathered for meta-analysis of the effectiveness of computers in classrooms. Several other studies (Burkhardt & Schoenfeld, 2003; Furlong & Oancea, 2005; Kaestle, 1993; Lagemann, 2000; Sroufe, 1997) drew similar conclusions concerning the state of educational research generally.

Most condemning, though, is the criticism leveled by Hargreaves, a respected Professor of Education at the University of Cambridge, during an Annual Lecture of the Teacher Training Agency. Hargreaves characterizes most of educational research:

> A few small-scale investigations of an issue which are never followed up inevitably produce inconclusive and contestable findings of little practical relevance…. Given the huge amounts of educational research conducted over the last fifty years or more, there are few areas which have yielded a corpus of research evidence regarded as scientifically sound and as a worthwhile resource to guide professional action.... (Hargreaves, 1996, p.2)

The literature contains few authors arguing that the subfield of instructional technology is significantly different from this characterization.

Data collection. The second area of weakness found by Waxman, Lin, and Michko (2003) was the poor methods used in collecting data. Only 25% of those 42 studies meeting the standards for inclusion were categorized as randomized experiments and only 67% as quasi-experiments. Poor methodology was also a subject of discussion in O'Dwyer et al. (2005) where many of the studies reviewed were criticized for having small or non-representative samples and were considered not to be generalizable. Selwyn (2012) expressed strong criticism saying that the field of instructional technology is a "notoriously sloppy area of scholarship—brimming over with lazily executed

‘investigations’ and standalone case studies, while tolerating some highly questionable thinking” (p. 213).

Inconsistent measurement of outcomes. The third area of weakness was the inconsistent measurement of outcomes. Waxman, Lin, and Michko (2003) found that 38% of the final sample making up the meta-analysis used a researcher-constructed test to measure outcomes, 14% used authentic assessments, and 10% used standardized tests. Additionally, 57% focused on affective outcomes and 83% focused on behavioral outcomes. O’Dwyer, Russell, and Bebell (2004) noted the lack of “refined measurement” or common variables in research on instructional technology. Even when researchers did use instruments validated by other researchers, they were too often misused. For example, Lee (2004) employed the validated English-as-a-second-language Placement Tests used at the University of Illinois at Urbana-Champaign. This placement test was administered at that time with pen and paper. The study intended to compare the quality of writing with word processors against writing with pen and paper, using the placement test as a valid measurement. Unfortunately, students were recruited for the study by offering them a chance to retake the placement test, using the test they just completed, but using a word processor instead of pen and paper (Lee, 2004). The method calls the results of the study into question even though it employed a valid instrument to measure writing quality.

Lack of standardized definitions. The fourth area of weakness identified by Waxman, Lin, and Michko (2003) was the lack of clear or standardized definitions. One of the biggest hurdles to the study of the impact of instructional technology in the classroom, including the use of word processors, is inconsistent terminology. For

example, the phrase “teachers’ use of technology” has been used to mean several different things, including a teacher’s use of digital multimedia during instruction, a teacher requiring students to use computers to produce something, and a teacher using a laptop to prepare handouts or to email other teachers (Bebell et al., 2004).

Waxman, Lin, and Michko (2003) found significant disparity in researchers’ definitions of terms as basic as “technology” and “student achievement.” In the meta-analysis’s final sample of the studies claiming to investigate “technology,” 30% investigated personal computers, 26% investigated networked labs, 5% investigated multimedia applications, and the remaining 39% investigated other incomparable technologies. The final OTA report in 1995 noted that research on instructional technology yielded confusing and often contradictory conclusions because different researchers used different definitions of what constitutes instructional technology use (U.S. Congress Office of Technology Assessment, 1995).

Whether or not a researcher includes non-instructional computer use in the definition of “teachers’ use” impacts the interpretation of results. In his often-cited book, Oversold and Underused, Cuban (2001) criticizes the conclusion that there is a positive connection between instructional technology use and student achievement. Cuban draws a conclusion at odds with those of other researchers in part because he separates the use of technology during class time from its use outside of class time. What is more important in this context, however, is that both critics and proponents of Cuban’s conclusions point out this difference to support their skeptical attitudes or positive attitudes towards instructional technology in schools (Bebell et al., 2004).

Unfortunately, most reports of research into the use of instructional technology and word processors in education fail to define terms clearly enough for readers to make the distinction between in-class and out-of-class uses. The results of surveys into teachers' use of technology, however, may shed some light. Connor, Higgins, and Russell (2003) found that across grade levels, the two activities teachers most frequently performed with technology was making handouts for students and creating tests, quizzes, or assignments using a computer—both out-of-class, word processor-based uses. In one of the largest studies of teacher's use of instructional technology—the Teaching, Learning and Computing (TLC) survey which included almost 3,000 teachers in 22 school districts—the researchers confirmed that though a majority of teachers did use technology to support their teaching, most of this use occurred outside of class time (Bebell et al., 2004). It is essential, then, that future studies not only explicitly define where and how the computers are being used, but to focus on how computers are used in classrooms and the relationships between those uses and student outcomes.

A New Generation of Technology and Technology Users in a New Millennium

Aside from concerns within various studies, there is the issue of the continuing development of word processing software. Of the hundreds of studies on the impact of word processors on student writing, over half of these studies were published before computers were widespread in classrooms (Goldberg et al., 2003). Further, the subjects of these earlier studies were students much less accustomed to working with computers than are students in 2011, when the NAEP writing test was administered, or later. Even in 1994, Markel (1994) reported that students who have become more confortable with a computer have more positive experiences writing with a word processor.

Word processing software has also undergone considerable development since the largest meta-analytical studies in the early 1990s and these changes likely affect the potential ability of word processors to support student writing. Throughout the 1980s, most word processing was done on dedicated machines, not on personal computers (Haigh, 2006). As personal computers became less expensive, software became more popular, but suffered from badly designed, non-standardized user interfaces (Haigh, 2006).

Computers with the graphical sophistication necessary to do more than simulate the dedicated word processing machines of the previous decade only arose in the 1990s (Haigh, 2006). The first word processors to leave the text-based DOS operating system in favor of the graphic capabilities and interface of Windows 3.1, the first widely adopted graphical user interface, did so in 1992—the year after Cochran-Smith's seminal meta-analysis (Bergin, 2006).

The advent of the graphical user interface necessarily changed the way students used word processors. For example, in 1984, Jacoby (1984) concluded that the longer length of essays written on word processors could be due to the removal of the "end of page effect" where students tend to end essays at the bottom of a page. The word processor machines of 1984 displayed only a few lines of text at one time and gave no indication where page breaks would be when the document was printed. Word processing software in 2011, when the NAEP writing test was administered, almost universally employ a typesetting analogy showing the user how the text appears when printed in WYSIWYG (what-you-see-is-what-you-get) fashion, thus duplicating the "end of page" effect by presenting the user with virtual pages of text.

Similarly, when studying experienced and inexperienced writers using word processors instead of pen and paper, Lutz (1987) argued that the machine's small screen size displaying only a few lines of text forced users to scroll more often and focus on smaller chunks of text, thus leading to lower-level edits, and encourages the use of hard copy of pen and paper when revising paragraphs. Word processing software has changed considerably in the 25 years since Lutz.

Writing Assessment

Standardized tests. Because the current climate of educational accountability often requires empirical, research-based evidence, standardized test scores remain a core means of evaluating the impact of instructional technologies (McNabb et al., 2000; O'Dwyer et al., 2005). At the same time, some researchers acknowledge that standardized tests may not provide valid measures of the learning that happens when students use computers in classrooms. McNabb et al. (2000) argued "the tools [used to] measure basic skills don't evaluate how instructional technology supports students in developing capacities to think creatively and critically and vice versa" (p.10). Russell, Bebell, Cowan, and Corbelli (2002) argued similarly, noting that since most standardized tests are geared toward broad measurements of knowledge, the specific skills or body of information improved by the use of instructional technology may be addressed by only one or two items on a standardized test.

Using word processors during writing assessment. Several studies have shown that the work students produce for writing assessments are different when students use a computer to write rather than pen or pencil and paper. When allowed to write and edit

text using a computer, as opposed to paper and pencil, for a state assessment, students produce both lengthier and higher-scoring essays (Damian Bebell & Kay, 2009).

Further there is evidence that the traditional paper-based assessments may be too insensitive for accurately evaluating the impact of instructional technology and technology savvy students (Bebell & Kay, 2009; Russell, 2002). In a series of empirical studies, Russell and colleagues found that students who were accustomed to writing with a word processor in the classroom scored between 0.4 and 1.1 standard deviations higher when they were allowed to use a computer for tests that require students to compose written responses (Russell & Haney, 2000; Russell & Plati, 2001). Improvements in student performance that can be seen in computer-based tests may be hidden in paper-based tests.

Word processors in comparison to other interventions. In a meta-analysis of more than 20 years of research, Graham and Perin (2007) found 11 key elements that when taught raised writing achievement in Grades 4 through 12. Teaching how to use word processors was found to have the fifth largest effect size, 0.55. This effect size combined instruction on how to use word processors themselves with the use of word processors in writing instruction. The average effect of using word processors during writing instruction was a slightly lower 0.51, but increased to 0.70 when the subject was limited to low-achieving students.

Graham and Perin's (2007) key elements contributing to greater writing achievement with larger effect sized than word processors were writing strategies (0.82), summarization (0.82), collaborative writing (0.75) and having specific product goals (0.70).

How Word Processors Change Student Writing

There is significant agreement among theorists on how word processors change a student's writing, all of which involves the word processor removing physical or physiological constraints (Daiute, 1983; Lutz, 1987). For example, using a word processor may allow the writer to produce longer, neater, and more legible texts by easing the physical strains of writing associated with writing on paper (Daiute, 1986; Graham & Perin, 2007). The tools usually included in the word processing program also change student writing. Spelling checkers, for example, are used not only to locate and correct errors in the text, but to help the writer generate new word choices when producing new text (Gupta, 1998).

Revising and editing. Most of the literature on word processors affecting writing focuses on how the use of word processors changes the writer's process of revising and editing text (Bean, 1983; Carole & Louth, 1988; Collier & Werier, 1995; Daiute, 1986b; Dave & Russell, 2010; Gupta, 1998; Hawisher & Moran, 1994; High, Hoyer, & Wakefield, 2002; Kehagia & Cox, 1997; Lutz, 1987; Macarthur, 1988; Owston, Murphy, & Wideman, 1992; Schanck, 1986; Waes & Schellens, 2003). Only a few researchers (Harris, 1985; Schanck, 1986) have found no significant difference in the revising between groups using word processors and writing by hand. Clearly, the inherent difference in word processors as opposed to paper and pencils is the ability to use the text is a more fluid manner: moving, changing, adding, and removing text anywhere in the document at any time without needing to rewrite the entire manuscript (Dave & Russell, 2010). This assumption was strongly supported in a survey of professional writers using word processors in which all respondents gave "easy editing" as a reason for using a

computer to write and more than half included “improves style” (Bernhardt & Appleby, 1985).

When students write with word processors they engage in revision throughout the writing process, rather than merely near the end of the process (Goldberg et al., 2003). More than that, continuous and easy revision allows students to share and receive feedback from peers and teachers and incorporates that feedback into their text much earlier in the development of the text (Graham & Perin, 2007; Zvacek, 1988). Not only do writers using word processors make more revisions and edits, they move back and forth through the text more frequently and in smaller chunks (Lutz, 1987). Dave and Russell (2010) noted the irony that the word processor introduced a new fluidity of writing just as the field of writing was embracing process-based writing instruction and the concept of “multiple drafts” as an important part of the writing process. With the adoption of word processors, the final draft is only “final” because the writer has decided to be finished (Hawisher et al., 1995).

Questions of interpretation. Though many researchers concur that more revising and editing happens when students use word processors as opposed to paper and pencils, there is less agreement on how to interpret this data. Lutz (1987) argues that the increased frequency of edits and movement around the text may indicate problems with word processors rather than advantages. Specifically, the linear and vertical presentation of the text may force writers to move back and forth more frequently to compare two parts of the text that do not appear on the screen together. Scrolling through the manuscript rather than jumping between nonadjacent pages forces the writer to spend more time looking at the text in a shallow way and provide more opportunities for small edits that do not

improve the writing quality (Lutz, 1987). Collier (1983) argued that word processors encourages the writer to focus on low-level editing on small passages of text and discourages the writer from focusing on structural changes in larger passages. For these reasons, many studies have concluded that counting the number of edits or revisions without regard to its level of change does not accurately measure the impact that word processors have on the quality of writing (Lutz, 1987; Zvacek, 1988).

Along the same lines, within all this editing and revising, some authors question whether the student is gaining a greater ability to detect the places in the document where revision and editing will improve the quality of the text. Sudol (1989), for example, claims that word processing encourages adding text rather than cutting. Student "accumulate" rather than change text because word processors prevent them from internalizing the habits of good writers previously imposed by the physical limitations of hand composing. The slower pace and fatigue of handwriting gave the writer the opportunity to digest the meaning of the ideas being written down, to think about the audience, and to value polished brevity. As one pair of teachers said, "Word-processing packages themselves do not teach students how to revise" (Rodrigues & Rodrigues, 1989, p. 15).

Beliefs about word processors

There is evidence that educators believe that word processing does improve student writing—though this evidence is different from, and sometimes contradictory to, the evidence of measurable impact on student achievement. After surveying 121 principals in 22 Massachusetts school districts, Abrams and Russell (2004) concluded that a "large majority of principals believe that the use of computers has a positive impact

on student learning and improves the quality of their writing and other work products" (p. 4). And yet, the same survey found "mixed views" regarding the degree to which instructional technology has been integrated into the curriculum and the "vast majority of principals indicated that they give 'least' or 'minimal' consideration to a teacher's instructional use of technology when conducting a performance evaluation" (p. 4). In other words, though these principals state a belief that integrating technology into instruction improves student achievement they have not actively encouraged the integration of technology into their school's instruction.

Correlating and Confounding Variables

O'Dwyer et al. (2005) found evidence that the student use of computers during the writing process has a positive relationship with students' performance on a state standardized test. Prior achievement and social and economic status were found to be statistically significant predictors of students' fourth grade total English/language arts scores, as well as their writing scores (O'Dwyer et al., 2005). By examining writing sub-test scores on a state mandated standardized test, O'Dwyer (2005) and colleagues found that different ways of using instructional technology were not equally effective predictors of achievement of writing and reading scores. In terms of writing scores, using computers for editing was found to be a significant positive predictor, while using computers to create presentations was a significant negative predictor (O'Dwyer et al., 2005). None of their analyses, however, accounted for more than 25% of the variance in test scores, leading the authors to conclude that there are other factors not measured which contribute to student achievement (O'Dwyer et al., 2005).

The National Assessment of Educational Progress

The National Assessment of Educational Progress (NAEP) is the congressionally mandated assessment of what students in the United States know and can do (National Center for Educational Statistics, 2009). Since 1969, The National Center for Education Statistics (NCES), part of the Department of Education's Institute of Education Sciences, has been collecting data on educational achievement to provide policymakers and researchers with useful information (National Center for Educational Statistics, 2009). The reports based on this monitoring of the performance of fourth-, eighth-, and twelfth-grade students in the United States have come to be known as "The Nation's Report Card."

NAEP differs from other standardized test in several important ways. First, from the very beginning, NAEP was intended to be a public document to inform congress and citizens about the educational state of young people in the nation (Bourque, 2009; Jones, 1996). To achieve this, each subject's assessment framework, which specifies what an individual of a given age should know and be able to do, is based on a consensus reached by a group of citizens and experts with a broad range of perspectives (Jago, 2009; Jones, 1996). Further, each item on the assessment must have face validity such that the connection between the question being asked can be easily connected to an assessment objective in the framework (Jones, 1996). These high standards of validity continue to make the assessment data valuable to researchers and policymakers.

Second, NAEP has carefully maintained assessment conditions over the years to allow comparisons to be made between assessments and valid conclusions to be drawn about how education achievement changes (Jones, 1996). In this way, NAEP has been

compared to the consumer price index or the national unemployment rate in that changes over time indicate the health of the system as much as the results of a single assessment (Jones, 1996; Mislevy et al. 1992). Breaks in the continuity of NAEP assessments are few, but occasionally subject frameworks must be rewritten to account for changes in the lives of young people in the United States. The 2011 writing assessment is based on just such a new framework, rewritten to accommodate new instructional technology and learning theory into the assessment (Applebee, 2005). Consequently, the results of this writing assessment cannot be compared to previous assessment of the same subject.

Secondary analysis. Another important way NAEP differs from other assessments is that NAEP "encourages researchers and policymakers to make use of the data and to perform their own analyses and studies" ("Funding Opportunities for the Secondary Analysis of NAEP Data," n.d., para. 1). Preserving data is not simple and is rarely funded, but NAEP is known for its dedication to preserving and distributing data explicitly for the purpose of assisting researchers in answering new questions (Glass, 1976). Aggregated NAEP data is made publically available for these secondary analyses, and student-level data is made available to qualified researchers. In 1984, scale scores were introduced to NAEP reporting in part to increase the precision of secondary analyses (Mislevy, Johnson, et al., 1992).

One good example of this vision for the importance and usefulness of secondary analysis is Wei (2012). This study was able to use NAEP data to relate the stringency of a state's No Child Left Behind Act (NCLB) accountability system with student achievement. This is important because not only does the No Child Left Behind Act of 2001 require a system by which states hold themselves accountable for student

achievement, it also requires all states to participate in NAEP assessments. And yet, no analysis of this relationship was investigated until the secondary analysis was performed in 2010. Wei (2012) found that more stringent accountability was related to higher Math achievement for Hispanic students.

Researchers also have access to all of the supplementary information collected by NAEP through background questionnaires. Students, as well as their teachers and school administrators, answer questions about how students spend their time, what resources are available at school, and hundreds of other topics relating to factors that may impact student achievement. This background information increases the usefulness of NAEP assessment data for secondary analysis by providing contexts for understanding achievement (National Center for Educational Statistics, 2009).

Conclusion

The history of research into instructional technology, and into word processors in particular, clearly shows that the relationships between students, technology, and performance are complex. More recent research has backed off from attempting to conclusively answer the question of whether or not using word processors alone improves student learning and writing. Too often, the only answer was, "it depends." Looking for such a direct relationship ignores the social and contextual nature of writing itself (Barton, Hamilton, & Ivanič, 2000; Prior, 2006). Instead, the field is working to untangle the relationships between student factors, technology factors, and environmental factors; to clarify to what extent each factor affects student performance; and to build models that reflect the complexity of these questions.

Chapter 3:

Method

The purpose of this study is to investigate the relationship between the use of word processers and students' scores on the writing content portion of the National Assessment of Educational Progress. This study intends to use valid and convincing data to answer two questions:

- To what extent is there a relationship between the level at which students use word processors in school and student achievement scores on the writing portion of the National Assessment of Educational Progress?
- What, if any, stated uses of word processers appear to correlate with higher student achievement?

To answer these questions, this study performs a secondary analysis of data from the National Assessment of Educational Progress (NAEP) writing subject test. NAEP is the largest nationally sampled assessment of American students' skills in a variety of subjects, including writing ("NAEP Overview," n.d.). The latest assessment of writing was conducted in 2011, with the reports and data being published in 2012. The 2011 writing assessment saw a significant increase in the focus that computers play in student writing and writing achievement. For the first time, the writing assessment was conducted via a simple word processor, rather than a traditional paper and pencil test, and several background survey questions were added asking students how they used computers in school and elsewhere. These new features allowed the researcher to investigate the topic in new ways.

This NAEP data will be analyzed by finding the difference between the test scores of students who used word processors more, and the test scores of students who used word processors less. For each variable of interest, the two groups of students are identified (the high-use students versus the low-use students) and the mean test score of each group is calculated. With an intermediate step to control for potential bias caused by secondary student characteristics, these two scores are compared and the difference between them is calculated as a z-score with a p-value. This procedure is repeated several times for each variable of interest using different secondary characteristics to control for bias. All of these results are finally collected into a table where patters of the effects of using word processors may appear. Heuristic evaluation of these patterns will be used to answer the research questions.

Data used in this Study

Data was collected from the Main NAEP database made accessible online by means of Data Explorer, the web-based tool provided by the National Center for Educational Statistics to extract data from the NAEP databases. The Main NAEP database includes information collected through cognitive and non-cognitive instruments during the writing subject assessment ("NAEP Technical Documentation," n.d.).

Data from the cognitive instrument. The cognitive instrument is the subject assessment itself. This instrument measures what a student knows and can do through short answer and multiple choice items as well as having students construct two writing samples in response to prompts (Applebee, 2011; National Center for Educational Statistics, 2012). The results of the NAEP cognitive test are reported in two ways: scale scores and achievement level scores. The writing scale score, ranging from 0 to 300, is a

composite score aggregating different scales from each area specified by the writing framework: the development of ideas, the organization of ideas, and the language facility and convention ("Interpreting NAEP Writing results," n.d.; "NAEP Analysis and Scaling - Estimation of NAEP Score Scales," n.d.; National Assessment Governing Board, 2010b). The scale score represents how well a student performed on the assessment overall.

Achievement levels represent three spans of scale scores on the writing assessment, called Basic, Proficient, and Advanced. These levels are defined by the National Assessment Governing Board prior to the test's administration and are based on the subject framework (National Assessment Governing Board, 2010b). These levels indicate how well the student performed in terms of what students are expected to know and be able to do ("Interpreting NAEP Writing results," n.d.). While the scale scores indicate student performance, achievement level scores indicate to what degree expectations have been met ("Interpreting NAEP Writing results," n.d.). For this study, student achievement was measured using the NAEP scale scores as they allow a finer degree of measurement of any relationships rather than whether or not broad sets of expectations have been met.

Data from the non-cognitive instruments. At the same time as the cognitive instruments are assessing what student know and can do, non-cognitive questionnaires are distributed to students, teachers, and administrators. These questionnaires inquire about the context in which students learn. Students indicate what they do in and outside of school, teachers respond to items asking about what happens in their classrooms, and

administrators answer questions about the school environment and policies ("NAEP Technical Documentation," n.d.; National Center for Educational Statistics, 2012).

The questionnaires accompanying the 2011 writing subject assessment also included items asking about the use of word processors in student work, in classrooms, and in school buildings. The surveys include items asking teacher how often they assign work with a word processor, and similar items asking students how often they use word processors in different ways (e.g., starting writing a paper, completing a paper started by hand, and editing a paper) (National Center for Educational Statistics, 2012). Data from these non-cognitive questionnaires were collected via Data Explorer to serve as measurements of general student use of word processors in schools.

Student Action Logs. Another important set of data is unique to the 2011 NAEP writing assessment. The Main NAEP database includes information about student activity while writing for the cognitive instrument. For the first time, the NAEP test was administered solely through laptop computers and had students use a word processor to write for the cognitive assessment. NAEP took advantage of this and created a new source of data by enabling the testing software to record which keys the students pressed while using the testing software's word processor. This data is reported through Data Explorer as the number of times students perform one of 24 activities (e.g., used the backspace key, used the paste function, or accepted a spell-check correction). This data is valuable to researchers because it allows them to see exactly how a student was using a word processor while his or her writing was being assessed.

This paper first describes the methods and data of the National Assessment of Educational Progress before turning to the methods this study used to analyze that data.

Variables Used in this Study

Twenty variables are used in this study to investigate the relationship between the use of word processors and student achievement. Each variable is extracted from one of the three sources of information housed in the Main NAEP database: the cognitive instrument, the non-cognitive instruments, and the computer logs. These variables are now collected into two groups reflecting how they are used here. The first group, referred to as the control variables, contains the five variables used to reduce bias, and the second group, referred to as treatment variables, contains the fifteen variables that together measure the student's use of word processors.

Control variables. During the analysis, variables from the first group, the "control variables" intended to control bias, will be used to define subpopulations of the whole sample. Splitting the sample into subpopulations will be used in the analysis to reduce the impact that any of these characteristics might have on the results. All five variables used to reduce bias are taken from the non-cognitive instruments. A full description of each can be found in Table 1. The variables taken from the principal's questionnaire are

- Gender
- National School Lunch Program eligibility
- School location

The student questionnaire is the source of the remaining two variables:

- Parent education level
- Race/ethnicity

Table 1
Full Information from the Main NAEP Database for Control Variables

Short Name	Full Title	Values
Gender	Gender of student as taken from school records	Male Female
National School Lunch Program eligibility	Student eligibility for National School Lunch Program based on school records (collapsed to three categories, as included in NAEP reports)	Eligible Not eligible Information not available
Parental education level	Parental education: Highest level achieved by either parent (based on student responses to two background questions)	Did not finish high school Graduated high school Some education after high school Graduated college Unknown
Race/ethnicity	School-reported race/ethnicity organized according to OMB guidelines introduced in the 2011 assessment, with an option to choose more than one race and a Native Hawaiian/Other Pacific Islander category that is separate from Asian	White Black Hispanic Asian American Indian/Alaska Native Native Hawaiian/Other Pacific Islander Two or more races
School location	Type of community where school is located, based on Census data describing proximity to an urbanized area (a densely settled core with densely settled surrounding areas) using four categories	City Suburb Town Rural

U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Treatment variables. The second group of variables, the "treatment variables," includes the 15 variables used to measure the student's use of word processors. These are taken from all three sources housed in the Main NAEP database: the computer logs created during the cognitive assessment, the teacher's questionnaire, and the student's questionnaire. A full description of these variables can be found in Table 2. The five treatment variables taken from the computer logs indicate how often the student performs

an action while writing responses using the testing software's word processor. These variables are

- Used the paste function
- Used backspace key
- Used delete key
- Used the spell check function
- Accessed thesaurus

The four treatment variables taken from the teacher's questionnaire measure how often a teacher asks students to perform some action or how many computers are available for the teacher's class to use. These variables are

- Ask students to use computer to complete writing started by hand
- Ask students to use computer to draft and revise writing
- Ask students to use word processing to check spelling
- Availability of computers for writing instruction

The six treatment variables taken from the student's questionnaire are similar to the items from the teacher's questionnaire, allowing each set to serve as an important check on the other. These remaining variables are

- Use computer for writing for school assignments
- Use computer from the beginning to write paper
- Use computer to complete paper
- Use computer to make changes to paper
- Used the computer to organize writing for the first writing task
- Used the computer to organize writing for the second writing task

Table 2
Full Information from the Main NAEP Database for Treatment Variables

Short Name	Full Title	Low-use Values	High-use Values
Used the paste function	Number of times student used the mouse, the [CTRL+V] keystroke combination, the menu, or the right-click context menu to paste text in a response (averaged across both writing prompts)	0 times 1 time	2 times or more
Used backspace key	Number of times student used the backspace key while typing a response (averaged across both writing prompts)	0 times 1-100 times 101-200 times 201-300 times	301-400 times 401-500 times 501 times or more
Used delete key	Number of times student used the delete key while typing a response (averaged across both writing prompts)	0 times	1 time or more
Used the spell check function	Number of times student used the mouse, the menu, or the right-click context menu to check spelling in a response (averaged across both writing prompts)	0 times 1 time 2 times	3 times 4 times or more
Accessed thesaurus	Number of times student used the menu or right-click context menu to access the thesaurus (averaged across both writing prompts)	0 times 1 time	2 times or more
Ask students to use computer to complete writing started by hand	How often do you ask your students to do the following when you ask them to write about something? Use a computer to complete writing that is started by hand (teacher-reported)	Never or hardly ever Sometimes	Very often Always or almost always
Ask students to use computer to draft and revise writing	How often do you ask your students to do the following when you ask them to write about something? Use a computer for drafting and revising their writing (teacher-reported)	Never or hardly ever Sometimes	Very often, Always or almost always
Ask students to use word processing to check spelling	How often do you ask your students to do the following when you ask them to write about something? Use word processing tools to check spelling or use a dictionary or thesaurus (teacher-reported)	Never or hardly ever Sometimes	Very often Always or almost always

Table 2 (continued)

Full Information from the Main NAEP Database for Treatment Variables

Use computer for writing for school assignments	How often do you use a computer, in and out of school, for each of the following activities? Writing for school assignments (for example, reports, essays, or letters) (student-reported)	Never or hardly ever	Once or twice a week
		Once or twice a month	Every day or almost every day
Use computer from the beginning to write paper	For school this year, how often do you use each of the following when you write a paper or report? Use a computer from the beginning to write the paper or report (for example, use a computer to write the first draft) (student-reported)	Never or hardly ever	Very often
		Sometimes	Always or almost always
Use computer to complete paper	For school this year, how often do you use each of the following when you write a paper or report? Use a computer to complete your writing (student-reported)	Never or hardly ever	Very often
		Sometimes	Always or almost always
Use computer to make changes to paper	For school this year, how often do you use each of the following when you write a paper or report? Use a computer to make changes to the paper or report (for example, spell-check or cut and paste) (student-reported)	Never or hardly ever	Very often
		Sometimes	Always or almost always
Used the computer to organize writing for the first writing task	Did you use the computer to make notes, plan, or organize your writing for the first writing task on this test? (student-reported)	No	Yes
Used the computer to organize writing for the second writing task	Did you use the computer to make notes, plan, or organize your writing for the second writing task on this test? (student-reported)	No	Yes
Availability of computers for writing instruction	Which statement best describes computer availability for your writing instruction? (teacher-reported)	There is no computer	2 to 3 students share one
		All students share one	Each student has one
		More than 3 students share one	

U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

During the analysis, "bundles" of data will be collected. Each bundle is a combination of one of the fifteen treatment variables with two of the control variables. All effects are calculated by such bundling, and thus explore any relationships between the use of word processors and student achievement with less bias and greater confidence.

The National Assessment of Educational Progress

NAEP participants. With subject-area assessments such as the 2011 Writing assessment, approximately four percent of the nation's three to four million students in each assessed grade are included in the sample (National Center for Educational Statistics, 2009; "Selecting the samples for the 2007 Writing assessment," n.d.). To ensure this relatively small sample is truly representative of the entire student population of the United States—including subgroups like ethnic minorities or students attending non-public schools—NAEP randomly selects samples from groups of schools that have been stratified by variables representative of the entire population, including extent of urbanization, percentage of minority enrollment, median household income, and state achievement test results (National Center for Educational Statistics, 2009). Further, some types of schools are oversampled to provide a large enough sample of minority populations (National Center for Educational Statistics, 2009).

NAEP materials. The NAEP is overseen by the National Assessment Governing Board (NAGB), an independent and bipartisan committee appointed by the Secretary of Education (National Assessment Governing Board, n.d.). The NAGB decides which subjects will be tested, the framework for assessing that subject, how the tests will be constructed, and how the results will be interpreted and reported (Ravitch, 2009).

Under the direction of the National Center for Education Statistics (NCES), contractors use the frameworks and associated specifications created by the NAGB to develop the questions used in the assessment instruments (National Center for Educational Statistics, 2009). These questions are then reviewed by a national committee of teachers, subject specialists, and measurement experts to ensure the assessment materials meet the framework specifications (National Center for Educational Statistics, 2009).

Throughout the process and after the assessment is completed, the questions used in the materials are kept confidential to protect the integrity of the assessment (National Center for Educational Statistics, 2009). This allows the questions to be used in subsequent NAEP material, providing continuity and accuracy for assessing trends in academic performance (National Center for Educational Statistics, 2009). When the results of a subject assessment are published, NAEP stops using about 25% of the questions and makes them available to the public (National Center for Educational Statistics, 2009).

The National Assessment Governing Board is also responsible for ensuring that NAEP assessments are valid, reliable, and free of bias (Ravitch, 2009). To assure the validity of NAEP, the National Center for Education Statistics contracts with the American Institutes for Research (AIR) to maintain an independent expert panel, called the NAEP Validity Studies (NVS) panel, to commission and discuss research addressing validity considerations for the NAEP program (NAEP Validity Studies (NVS) Panel, 2002; Stancavage et al., 2002).

For most subject assessments, the test materials themselves are paper booklets produced by Balanced Incomplete Block spiraling (National Center for Educational Statistics, 2009). Blocks of test questions are balanced by printing each block an equal number of times in every possible position in the booklets (National Center for Educational Statistics, 2009). One of each different booklet is then packed together for distribution to test coordinators who randomly assigns booklets to students (National Center for Educational Statistics, 2009). These procedures promote comparable sample sizes for each booklet and ensure these samples are randomly equivalent (National Center for Educational Statistics, 2009).

NAEP computer-based assessment. The 2011 writing assessment was the first time NAEP used a computer-based assessment rather than a paper-based assessment. This change was made to acknowledge "the vital role computers play in both student composition and writing instruction" (National Assessment Governing Board, 2010b, p. 29). The National Assessment Governing Board decided that since computers have become the established means of producing academic and professional writing, computer-based testing should become the established means of large-scale assessments (Applebee, 2005).

After several pilot studies and analyses, the National Assessment Governing Board determined that the use of computers, especially word processors, did not significantly change the outcome of the assessment for groups of students (Applebee, 2005; Durán, 2000; Hedges, Konstantopoulos, & Thoreson, 2000). Students were provided with those tools commonly available to writers using word processors,

including editing tools (such as copy, cut, paste, undo/redo), paragraph formatting tools, tools for checking spelling and grammar, and reference tools (Applebee, 2005).

NAEP Procedure. Once NAEP has received the cooperation of selected schools, data collection contractors are assigned to administrate in the field (National Center for Educational Statistics, 2009). The data collection contractor is responsible for selecting the sample of students within each school, printing test booklets, hiring and training staff to conduct assessments, and providing quality-assurance during the testing program (National Center for Educational Statistics, 2009).

To ensure confidentiality and to improve accuracy, bar codes are used to identify the test booklet with the number pre-assigned to each selected student (National Center for Educational Statistics, 2009). Any material that could be used to identify any student is destroyed by the data collection contractor—unlinking student names, schools, teachers and background information (National Center for Educational Statistics, 2009).

Since the 2011 Writing subject part of NAEP was to use the computer-based testing, each student was given a laptop computer to replace the usual paper booklet. To begin testing, software on the computer first presented students with a tutorial on using the software itself to answer questions and compose writing samples. Once successfully completing the tutorial, the software began presenting items to the students and recording responses. This was followed by three 30-minute writing periods. In each period, the software delivered a writing prompt and an integrated word processor with which to compose a writing sample.

Methods Used In This Study

General procedures for observational studies. This study attempts to overcome some of the methodological weaknesses of previous research on the student use of word processors—weaknesses found throughout the fields of instructional technology research. As discussed previously, these weaknesses are in part the result of necessary limitations educational researchers impose on themselves. This study seeks to advance the field of research by using high-quality data and valid procedures to investigate the wider landscape of relationships between academic achievement and instructional technology.

This study, as all studies using the NAEP dataset, cannot claim to establish causal links between treatments and effects, due to the lack of randomized collection of subjects into treatment and control groups. The randomized experiment is the most powerful design for estimating a causal effect of an independent variable on a dependent variable (Winship & Morgan, 1999). Unfortunately, in social science and education controlled experimentation is often very difficult, if not unethical or even illegal. To study the link between smoking and health, for example, a researcher could not randomly select people to begin smoking. Neither could a researcher select some students to receive a promising new educational program while maintaining a control group of students who are denied what seemed to be a better education.

This study turns to observational data, as does most educational research, because a controlled, randomized experiment on the use of word processors is not possible. Cochran and Chambers (1965) described an observational study as the collection of data in situations for which it "is not feasible to use controlled experimentation, in the sense of

being able to impose the procedures or treatments whose effects it is desired to discover, or to assign subjects at random to different procedures" (p. 234).

Reducing bias as an observational study. Since this observational study seeks to illustrate the relationship between specific activities and specific measurements, what in an experimental study would be called the treatment and the effect, this study relies on statistical methods to adjust for potential selection bias that the lack of random assignment introduces via unbalanced covariates. Most social and educational researchers adjust for bias by using a statistical model that makes assumptions about the relationships between outcomes and variables (Rubin, 1997). Regression, as one such statistical model, assumes a linear relationship between the outcome and the covariate. Unfortunately, when the assumed relationship of the statistical model (e.g., linearity is assumed in a linear regression model) does not fit well with the true relationship between independent and dependent variables, the bias of the estimates can increase rather than decrease (Rubin, 1979; Stuart, 2010; Winship & Mare, 1992).

Rather than assuming a single predefined relationship between word processing and academic achievement with the use of a statistical model, this study takes advantage of the breadth and quality of the NAEP dataset to explore a wide range of potential relationships between the use of word processors and writing achievement. Most significantly, this study examined potential relationships in terms of "subpopulations"—sets of background covariates that would otherwise be difficult to detangle from the estimation of effect. This is important because increasing similarity in terms of the distribution of background covariates causes the treatment variable, the use of word processors, to become more independent from the potentially confounding covariates

(Ho, Imai, King, & Stuart, 2007). While it is difficult to unequivocally establish causal relationships in the absence of a randomized study, by showing consistency of effect across subpopulations this study will provide empirical evidence suggesting the plausibility of an association between word processing and an increase in academic achievement that warrants further study. The understanding of the current landscape of word processor use and associated achievement provided by this study is essential for the design of efficient experimental studies whose focus is on establishing causation ("Cautions in Interpreting NAEP Results," n.d.).

Limitations of the method. As for most secondary data analyses, what conclusions can be drawn from NAEP is limited by the original purpose of the study. The primary purpose of NAEP is to provide information about what groups of students know and can do, rather than what individual students know and can do, which is the goal of many other assessments. As such, the design of NAEP focuses on increasing the scale of, the regularity of administration of, and the quality of data collection and analysis; and NAEP is alone in that important focus ("Research with NAEP Data," n.d.).

Of course, there are necessary consequences to this focus, as there are trade-offs with all methodologies. For example, as the scale of assessment increases, the burden on any individual student, teacher, and school increases. Further, maintaining a high quality of data collection is quite costly. To keep individual burden and study costs reasonable, NAEP does not administer the entire assessment to any single student ("NAEP Analysis and Scaling - Plausible Values Versus Individual Scores," n.d.; "NAEP Analysis and Scaling - Using Population-Structure Model Parameters to Create Plausible Values for Later Computation," n.d.). This design choice places limitations on how researchers may

use the database of NAEP results. In particular, the National Center for Education Statistics discourages researchers from drawing unfounded conclusions about the causal effect of any characteristic on individual student achievement.

This distinction between the methodological choices of NAEP and other assessments, and the trade-offs therein, is essential when making decisions about appropriate research questions. NAEP reports are also called "The Nations Report Card" for a good reason: their purpose is to monitor the health of education in the United States, which includes accurately measuring the performance of subpopulations. Like a report card, it provides information about where future resources might best be focused, but cannot diagnose the underlying problems or suggest specific treatments for discovered weaknesses (Podgursky, 2002). These questions require other types of research using different methodologies.

This study does not suffer from these inherent limitations of the NAEP data, as it does not intended to discover what uses of word processors cause increases in student academic achievement—the NAEP dataset is not able to support such claims. Instead, this study is intended to illustrate or clarify the landscape of relationships between academic achievement and the grouping of students around uses of word processors in academic work. It is hoped that future research, utilizing more experimental methodologies, will be able to rely upon the results of the study to target research questions and hypotheses most likely to have the greatest impact on student success.

Mitigating NAEP methodology limitations. Many of the drawbacks of the NAEP methodology derive from the fact that students are not administered the entire test but receive only a portion of the items. The result is an unacceptable level of uncertainty

in individual scores—so much so that the individual scores are never even calculated ("NAEP Analysis and Scaling - Why Population-Structure Models Are Necessary for Analyses of NAEP Data," n.d.). In its own analysis, NAEP mitigates this uncertainty by using population-structure modeling, a statistical model that relates the scale scores in the assessment to the groups to which the student belongs and not to the individual student ("NAEP Analysis and Scaling - Plausible Values Versus Individual Scores," n.d.).

To provide data for secondary analysis, NAEP uses the demographic information collected during the measurement together with population-structure models to create "plausible values" ("NAEP Analysis and Scaling - Using Population-Structure Model Parameters to Create Plausible Values for Later Computation," n.d.) Plausible values reflect both the student's achievement and the degree of uncertainty in measuring that achievement due to the fact that students are not shown every test item, but respond only to a relatively small number of randomly chosen questions ("NAEP Analysis and Scaling - Plausible Values Versus Individual Scores," n.d.). In other words, several scores are given to each individual, and the differences among these scores reflect the magnitude of the measurement error. The plausible values represent a student's "range of ability" based on the individual student's response to a subset of items (Wu, 2005). Since the background variables of the groups of students are included in the plausible values, via the Population-Structure Model, these values are especially important to secondary analyses interested in the relationships between background variables and scale scores (Harkay, 2000).

The research questions in this secondary study are answered by the average scale scores of groups of students rather than individual scores. To learn about the mean

achievement of a pre-specified group, NAEP can treat each individual's plausible values as if they were multiple imputations of missing scores to calculate estimates of the average scale score in the subgroup and its approximate standard error (Mislevy, Beaton, Kaplan, & Sheehan, 1992). In the case of NAEP data, the five reported plausible values for each student can be combined with information from the sampling design to produce estimates of average scale scores and, equally importantly, associated standard errors that reflect both the sampling design of the study (i.e., that a subsample of US students are representing the entire US student population) and the measurement error of the instrument (i.e., that each participant is asked a small portion of the questions on the test). These can, in turn, "be used in standard statistical equations for many statistics of interest and can be used to correctly estimate the standard errors for those statistics" ("NAEP Analysis and Scaling - Using Population-Structure Model Parameters to Create Plausible Values for Later Computation" n.d., para. 1).

Further limits placed on public NAEP data. The processes described above are necessary for all analyses of NAEP data, including those reported by the National Center for Educational Statistics. NAEP data released to the public, however, are further restricted in that this information can only be accessed through the NAEP website using the NAEP Data Explorer. While Data Explorer is an excellent tool for simple analyses, it does not allow sophisticated statistical modeling. For example, Data Explorer will permit the researcher to look at combinations of only three variables for any single analysis. Therefore, each of the variables in the operationalized definition of "students use word processors" will be analyzed independently rather than in concert with the other variables in the definition. Each analysis, however, will control for the same variables that may

confound investigation into computer use in schools. Patterns in the results of this series of statistical analyses will be interpreted heuristically to answer both research questions.

Usually, a more granular, student-level set of NAEP data (called "restricted-use") is made available to universities and carefully selected researchers, allowing them to bypass the limitations imposed by Data Explorer on the publicly available data. Unfortunately, the restricted-use dataset for the 2011 NAEP Writing Assessment was never made available at all. All secondary analyses of the 2011 Writing Assessment, including this study, are analyses of the NAEP public dataset with its associated limitations.

Addressing issues of quality, validity, and generalizability. To avoid the problems of general quality, validity of methods and instruments, and lack of generalizability that plague much of instructional technology research, this study relied on an array of statistical calculations of mean NAEP scale scores. Each result is a combination of one of the treatment variables and two of the control variables. These combinations effectively control for any bias potentially introduced by gender, race, level of parent's education or the other characteristics described by the control variables. The effect of each of the treatment variables is calculated 10 times, once for each possible pair of the five control variables (e.g., gender/race, gender/parent's education, and race/parent's education). The result of each calculation is placed in template Table 3. The table has 15 columns; one for each treatment variable representing a particular way a student could use a word processor, and 10 rows, one for each of the possible pairs of control variables. By looking across the row, one can see how a particular way a

Table 3

Blank template for recording results of bundle analyses

Variable	Gender and School Lunch		Gender and School Location		Gender and Parent Education		Gender and Race/ Ethnicity		School Lunch and School Location		School Lunch and Parent Education		School Lunch and Race/ Ethnicity		School Location and Parent Education		School Location and Race/ Ethnicity		Parent Education and Race/ Ethnicity	
	Z	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*
Student action logs																				
Paste Function																				
Backspace Key																				
Delete Key																				
Spell Checking Function																				
Thesaurus Function																				
Teacher questionnaire																				
Complete Writing Started by Hand																				
Draft and Revise																				
Check Spelling																				
Availability for Writing Instruction																				
Student questionnaire																				
For School Assignments																				
From the Beginning																				
To Complete Paper																				
To Make Changes																				
To Organize 1st Writing Task																				
To Organize 2nd Writing Task																				

Note: α=.001

word processor is used interacts with student achievement scores, while controlling for all five of the control population variables.

Subpopulations. Bias is further reduced by basing each result described above not on the mean test scores of entire the populations described by the pair of control variables, but by basing that result on the mean test score of each possible combination of the values within each control variable. For example, this study is interested in the effects of using the paste function (as one treatment variable). One of the results that will be placed into the results table is the effect of the use the paste function when controlling for gender and race (two control population variables). In other words, the result placed in the table is the difference between the mean test score of those students who use the paste function more and the mean test score of those students who used the paste function less, and this controlled for the characteristics of gender and race.

Further, the method calls for finding the mean test scores of the "subpopulations" of students. Each subpopulation is defined as one of the possible ways the values within the control variables can be combined. If the two control variables are gender and race, the subpopulations would be White males, White females, Hispanic males, Hispanic females, Black males, Black females, and so forth.

High use and low use groupings. The first step in calculating the results of using the paste function is to find two mean test scores for each subpopulation, one for the high-use group in that subpopulation, the other for the low-use group in that same subpopulation. In this example, the method calls for finding the mean test score of "Black females who did not use the paste key very often" as well as the mean test score

of "Black females who did use the paste function more often." It is the difference between these two mean test scores that form the bases for the calculation of the results.

The final step in reducing bias is to weigh each of the mean test score differences according to the size of the subpopulation. Since there are more White males then Black females in the sample, the difference in test scores between White males will influence the result more.

To reduce bias and increase confidence in the results, this study uses the mean test scores of the least aggregated samples possible under the circumstances. This method improves the accuracy of estimating relationships between variables of interest and groups of students while avoiding issues of causation. More importantly, this method results in the clarification of the entire landscape of relationships between word processors in academic work, groups of students, and academic achievement—arguably a more valuable addition to instructional technology research than simply an estimation of an effect on the population.

Collapsing multiple values into two categories. All of the treatment variables of interest used in this study come from the non-cognitive instruments (including the computer logs) that describe student and teacher behavior in the classroom. Though a few of the items offer only two possible responses, the majority of these questionnaire items offer a choice of three or more ordinal responses. For variables that offered three or more values to select as a response, this study has collapsed the multiple response values into two categories of response, generally a low-use category and a high-use category. These categories are created by first placing the lowest response value into the low-use category, and then placing the highest response value into the high-use category. This is

repeated with the remaining values until all possible response values have been placed in a category.

This method does mean that any variable with an odd number of response values will have one more value in the low-use category than in the high-use category—the median value being placed into the low-use category. This is acceptable because it decreases the likelihood of Type I errors if there is a positive relationship between the use of word processors and achievement score. Including the median value in the low-use category will move the mean test score of the low-use group towards the real mean score of the population. This increases confidence in any statistically significant differences between the mean scores of the two groups because the high-use group's mean score is more likely to be different from the population mean. It should be noted, however, that this is true only for situations where the mean score of the high-use group is greater than the mean score of the low-use group. If the actual relationship between the use of word processors and achievement score is negative, the likelihood of Type II errors increases.

There are two arguments for collapsing ordinal variables in this study. First, the purpose of this study is not to investigate the causes of scale score changes, but to illustrate the relationships between groups of students and scale scores. The methodology chosen to accomplish this values breadth of variables and samples more than granularity of data. This study chooses to widen the view at the expense of the higher resolution the lost information may have provided.

Second, in practice, the dichotomization of variables typically does not lead to different conclusions, though it does often lead to attenuated relationships between dependent and independent variables as well as smaller effect sizes (DeCoster, Iselin, &

Gallucci, 2009). In this study, both of these effects are tolerable. In fact, the limitations of the public data offered by NAEP deny researchers the ability to calculate effect sizes. Further, the size of any single relationship between a use of word processors and a scale score is not as important as the overarching pattern of relationships. Collapsing variables into two categories benefits the study by increasing the number of groups that can be included in the study without significantly risking errors in results or interpretations.

Procedure for this study

Collecting Data Bundles using the NAEP Data Explorer. Researchers use the Main NAEP dataset by extracting reports through NAEP Data Explorer. Reports are created in four steps: selecting criteria, selecting variables, editing the reports, and building the reports.

Select Criteria. This study uses five criteria to begin building reports. The subject criteria is "Writing," the grade criteria is "Grade 8," the framework criteria is "2011 Writing," the measure criteria is the "Writing scale" for "2011," and the jurisdiction criteria is "National" with no regional group criteria. This is illustrated in Figure 1.

Select Variables. There are 279 variables available in the Main NAEP dataset, organized into category and subcategory. Since the previously selected criteria make only the 2011 data available, the researcher needs only to choose the variable and not the year the data was collected. All of the variables used in this study are selected. This is illustrated in Figure 2.

Figure 1. Select criteria. The criteria "Writing," "Grade 8, and "National" are selected. U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

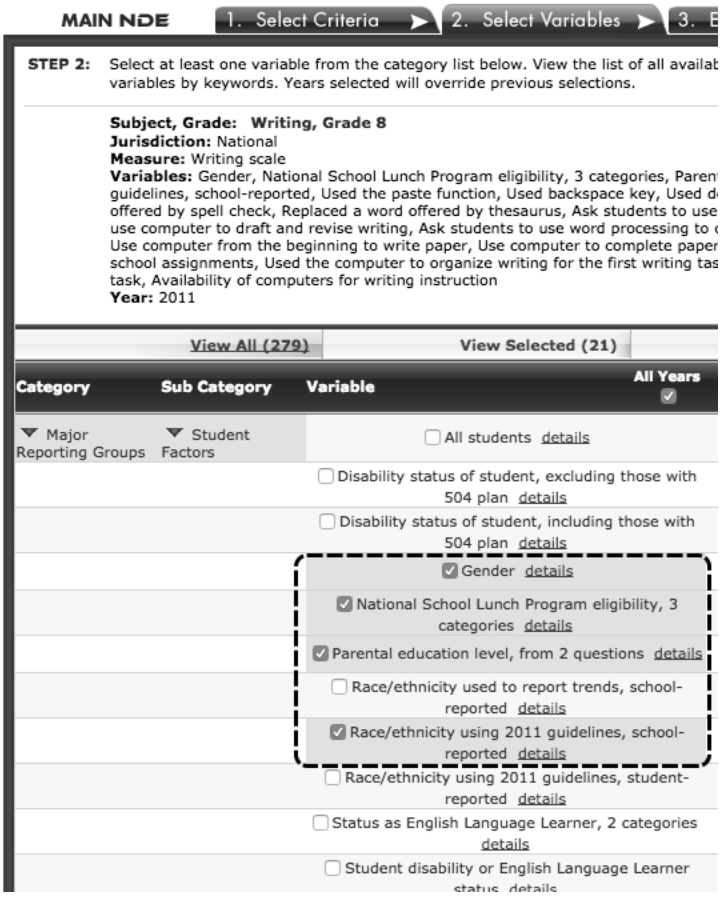

Figure 2. Select variables. This study selects 20 variables. U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Edit Reports. A customized report was created for each "bundle" of data that would be used to fill in a cell on the results table. Each bundle consisted of one treatment variable and two control variables. Each treatment variable was bundled once with each possible combination of the five control variables, yielding ten bundles for each variable of interest. Since there are fifteen variables of interest, a total of 150 bundles of data were created by custom reports. Each report was created in four steps. First, all of the previously selected criteria (the writing scale measurement, the national jurisdiction, and the year 2011) were confirmed. Second, if the variable of interest for this bundle offered four responses, the variable was collapsed into high-use and low-use categories, as illustrated in Figure 3. Third, the three variables in a bundle were selected and arranged so that the treatment variable formed the columns of the report and the control variables formed the rows, as illustrated in figure 4. Finally, the "Average scale score" was selected as the statistic to be reported. These steps were repeated 150 times with different combinations of variables to create all the required bundles. The report from the NAEP Data Explorer is shown in Figure 5. An additional ten reports were created where the treatment variable was removed and the "Percentages" was selected as the statistic to report, as illustrated in Figure 6. These reported what percentage of the U.S. population of schoolchildren each subpopulation represented, as illustrated in Figure 7. This information, denoted, was used in the 150 calculations of results to ensure that each subpopulation affected the results with the appropriate amount of weight.

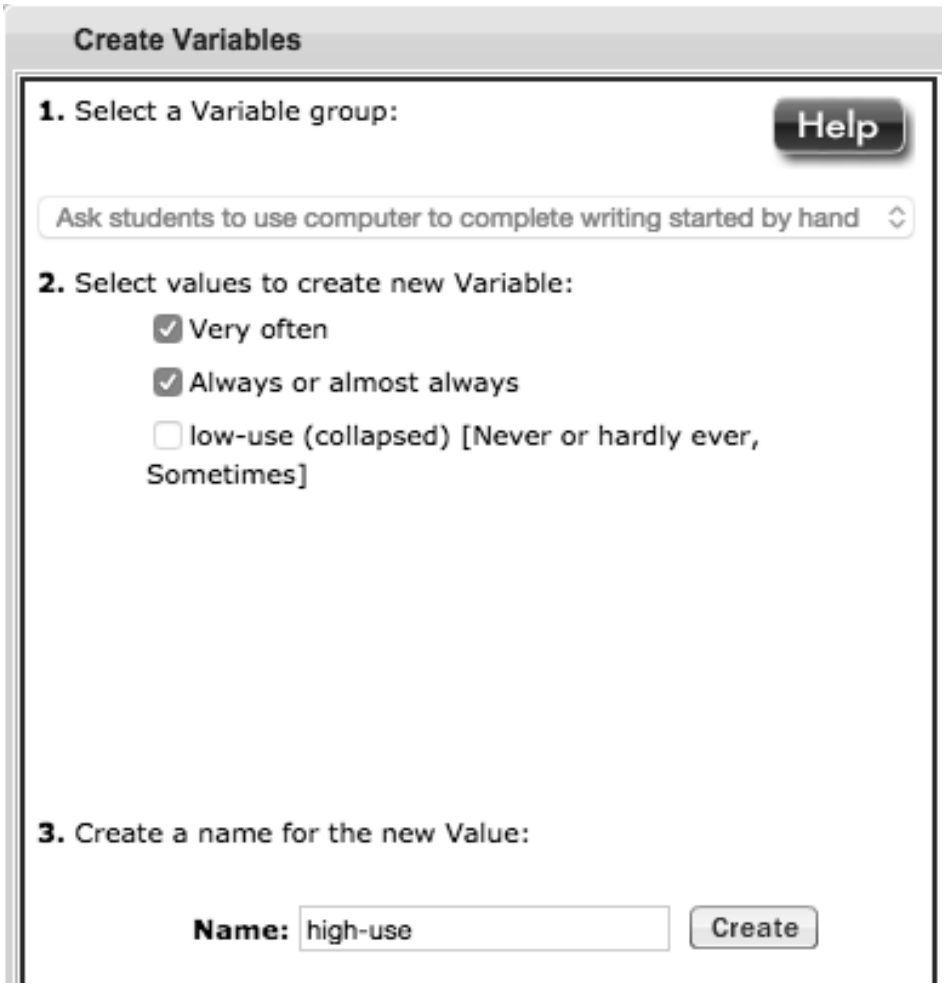

Figure 3. Collapsing four values into two groups. The low lower use values define the low use groups. The two higher values define the high use group. U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

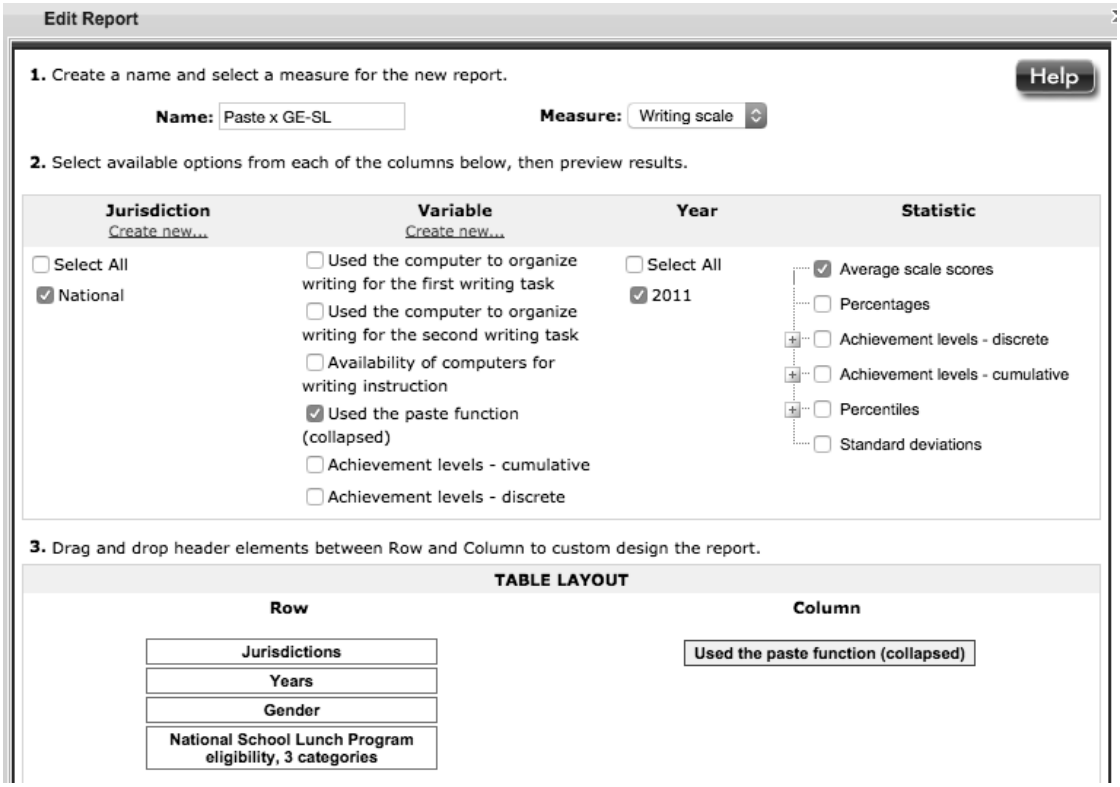

Figure 4. Variable bundle arranged for a report. The treatment variable is included as a column and the two control variables are included as rows. U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Analysis of Single Data Bundle. Custom reports provided information about the relationship between the two categories of the variable of interest (high-use and low-use) with each subpopulation formed from the two control variables. A subpopulation consisted of all students who shared two traits, one from each control group. For example, if the two control variables in a bundle were the student's gender and the student's parents' level of education, one subpopulation would be all male students whose parents graduated from college, another subpopulation would be all female students whose parents graduated from college, a third would be all male students whose parents graduated from high school, and so forth. In the custom report, as in Figure 5, Data Explorer provides the researcher with two average scale scores for each

subpopulation: the average scale score for those in the subpopulation with low use of the variable of interest, and those in the subpopulation with high use of the variable of interest. Each of these average scale scores (denoted below as $\hat{\mu}_{low,sub}$ and $\hat{\mu}_{high,sub}$, respectively, as these are estimated from the plausible scores as described above rather than simple score averages) was accompanied by the standard error of the average score for that subpopulation, $SE(\hat{\mu}_{low,sub})$ and $SE(\hat{\mu}_{high,sub})$ respectively.

				Low Use of Paste Funct. (collapsed)		High Use of Paste Funct. (collapsed)	
Jurisdiction	**Year**	**Gender**	**National School Lunch Program eligibility, 3 categories**	Average scale score	Standard Error	Average scale score	Standard Error
National	2011	Male	Eligible	125	(0.7)	116	(2.4)
			Not eligible	152	(0.9)	144	(2.8)
			Information not available	154	(2.7)	‡	(†)
		Female	Eligible	144	(0.6)	136	(3.3)
			Not eligible	171	(0.8)	172	(2.4)
			Information not available	171	(2.6)	‡	(†)

† Not applicable.
‡ Reporting standards not met.

Figure 5. NAEP Data Explorer Report. The two control variables are in rows and the treatment variable is in columns. U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Next, each subpopulation was assigned a percentage that reflects the proportion of the population of US schoolchildren who comprise this subpopulation. This information was taken from a second report, illustrated in Figure 6, one of the ten final reports that did not include the variable of interest in the bundle.

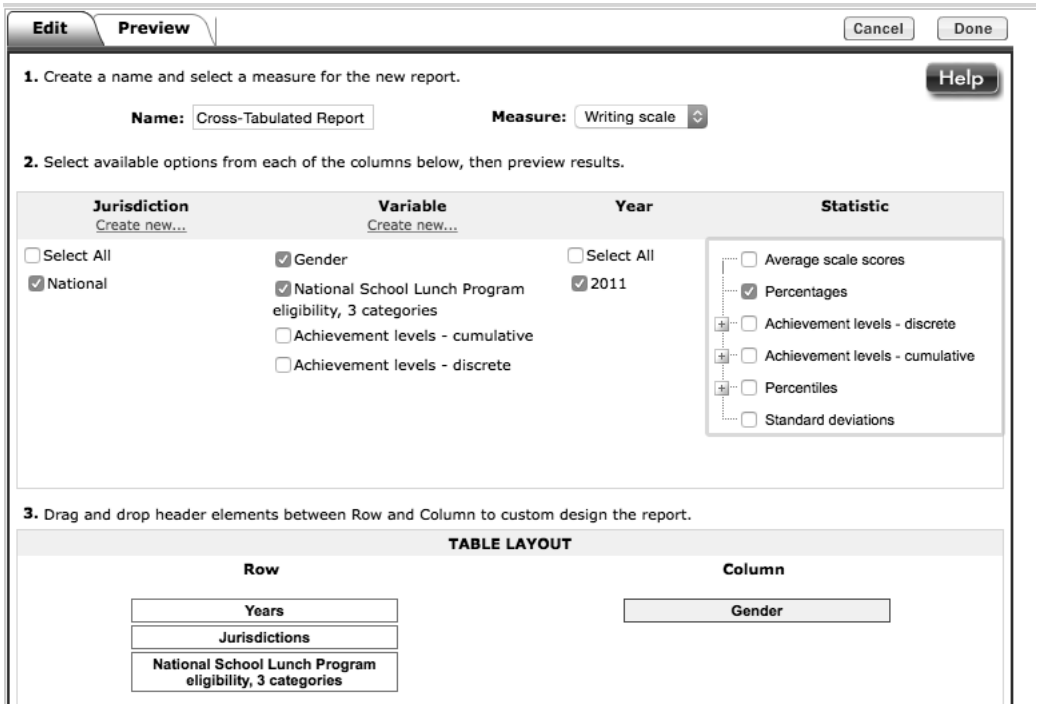

Figure 6. Requesting Percentages. The treatment variable is removed and the statistic is changed to "percentages." U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Estimating the effect of the variable in the population. The first part of the actual analysis was to estimate the effect of the statistic of interest on the population, controlled for the two control variables in the bundle. This was calculated in three steps (see Appendix A for full example of calculation tables).

Step 1: estimating the effect in each subpopulation. The effect of the variable of interest in each subpopulation (recall that subpopulations here are composed of all possible combinations of the values of two control variables) was estimated by subtracting the average scale score of the subpopulation's low-use group from that of the subpopulation's high-use group, denoted $E_{sub} = \hat{\mu}_{high,sub} - \hat{\mu}_{low,sub}$. The effect is the difference in average scale score. For example, looking at the report in Figure 5, the estimated effect of using the paste function for the subpopulation of "Females Not

Eligible for the National School Lunch program" is 1, as is found using Equation 1, since the mean scale score of the low-use group in that subpopulation is 171, and the mean scale score of the high-use group in that same subpopulation is 172.

$$E_{GE,SL} = \hat{\mu}_{highuse:GE,SL} - \hat{\mu}_{lowuse:GE,SL} = 172 - 171 = 1 \quad (1)$$

Step 2: adjusting the estimations of effects. As an intermediary step, each of the above estimations was adjusted to reflect the weight each subpopulation would contribute to the estimation of the variable's effect in the whole population. The adjusted value was equal to dividing the subpopulation's percentage of the whole population by 100, and multiplying this quotient by the previously found above estimated effect of the variable of interest for that subpopulation, as in Equation 2.

$$E_{sub}^{adj} = E_{sub}\left(\frac{P_{sub}}{100}\right) \quad (2)$$

For example, because we estimate that 49% of US students are "Females Not Eligible for the National School Lunch program," according to the report in Figure 7, that subpopulation's estimate of effect—found in Step 1 to be 1—would be multiplied by 0.49. Thus the adjusted estimate of the effect for this subpopulation would be $1 \times 0.49 = 0.49$.

Percentages for writing, grade 8 by gender [GENDER], year, jurisdiction and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

			Male		Female	
Year	**Jurisdiction**	**National School Lunch Program eligibility, 3 categories**	Percentage	Standard Error	Percentage	Standard Error
2011	National	Eligible	50	(0.5)	50	(0.5)
		Not eligible	51	(0.4)	49	(0.4)
		Information not available	51	(1.9)	49	(1.9)

Figure 7. NAEP Data Explorer percentage report. Rows indicates what percentage of the U.S. student population is represented by the subpopulation. U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Making these adjustments within subpopulations increases the confidence the researcher has in the final estimations of effect in the whole population. This adjusted estimate of the effect is each subpopulation's contribution to the estimated effect of the variable of interest in the population. In other words, this step divided the yet-to-be determined estimate of the effect in the population into 100 boxes. Into each of these boxes was placed one one-hundredth of the estimations of the effect in one of the subpopulations. How many boxes each subpopulation was assigned was determined by its percentage of the total population. If a subpopulation represented 3% of the population, one one-hundredth of this subpopulation's estimation of effect would be assigned to 3 of those 100 boxes. Because this adjustment is an intermediary step to estimating the average effect in the whole population, the adjusted effect should not be interpreted on its own.

Step 3: estimating the effect of the variable in the population. The estimation of the effect of the variable of interest in the total population is the sum of all the adjusted estimates of the effect in subpopulations, as in Equation 3.

$$E_{pop} = \sum_{sub} E_{sub}^{adj} \tag{3}$$

To continue the boxes analogy, this is like adding the contents of all the boxes together. This works because the as yet unknown estimate for the population was split into 100 boxes, values equal to one one-hundredth of estimates were placed in each of those boxes, and then the 100 boxes were put back together by adding the adjusted estimates held in each box. This value is the final estimation of an effect in the whole population.

Estimating the variance of the estimated effect. The variance of the estimated effect in the population reveals how much of the variability between the mean scores of high-use and low-use groups can be attributed to random variations and is used to evaluate the usefulness of the estimation of effect in the population. The variance of the estimated effect in the population was calculated using a similar process as above, but using the standard errors associated with each average scale score reported with the data bundle. As described above in the section "Mitigating NAEP methodology limitations," the NAEP Data Explorer reports standard errors that incorporate both sampling and measurement error. This took five steps (see Appendix B for full example calculation tables).

Step 1: the variance of the low-use score. The variance of the estimate of average scale score of the low-use group in each subpopulation was found by squaring the standard error of the estimated mean scale score of the low-use group in this subpopulation: $Var(\hat{\mu}_{low,sub}) = SE(\hat{\mu}_{low,sub})^2$. Recall that this variance reflects both the sampling error (which would equal zero if the entire US student population were included in the study) and the measurement error (which would in theory approach zero as the number of questions posed to each student increased.)

Step 2: the variance of the high-use score. Similarly, the variance of the estimate of average scale score of the high-use group in each subpopulation was found by squaring the standard error of the estimated mean scale score of the high-use group in this subpopulation: $Var(\hat{\mu}_{high,sub}) = SE(\hat{\mu}_{high,sub})^2$.

Step 3: the variance of the estimated effect in subpopulations. The variance of the estimation of the effect in each subpopulation (i.e., the difference between the average scale scores of the high- and low-use groups) was found by summing the above variances of the average scale score of both high-use and low-use group in this subpopulation, and subtracting an assumed covariance of zero, as in Equation 4.

(4)

$$Var(E_{sub}) = Var\left(\hat{\mu}_{high,sub} - \hat{\mu}_{low,sub}\right) = Var\left(\hat{\mu}_{high,sub}\right) + Var\left(\hat{\mu}_{low,sub}\right) - 2 \times 0$$

An assumption must be made for the covariance here because the NAEP Data Explorer will not provide the data necessary to calculate a covariance. By assuming no covariance between the high-use and low-use groups, the researcher assumes a sort of "worst case scenario" that ensures that the variance of the estimated effect is not underestimated, adding some confidence in the final test statistics. The researcher believes that zero covariance is the "worst case," as the covariance between the estimates of the means is unlikely to be negative. It is well known that mean estimates for two subpopulations in a sample survey tend to have small correlation due to the sampling design (none for binary variables) (Cochran, 1977). Thus, the covariance in the two mean estimates would come predominantly from a correlation due to both estimates

relying on the same measurement error model (used by NAEP to construct the plausible values)— a covariance likely to be small and positive.

Step 4: calculating the variance of the adjusted estimates. As the estimations of the effects in subpopulations were adjusted previously, the variance of those estimations were also adjusted—using Equation 5—to reflect the amount of variance each subpopulation contributed to the variance of the estimate of the effect of the variable of interest in the population. The adjusted value was the variance of the estimate of the effect of the variable of interest for a subpopulation (found above) multiplied by the square of the results of dividing the subpopulation's percentage in the whole population by one hundred.

$$Var\left(E_{sub}^{adj}\right) = Var\left(E_{sub} \times \frac{P_{sub}}{100}\right) = Var(E_{sub}) \times \left(\frac{P_{sub}}{100}\right)^2 \tag{5}$$

Step 5: the variance of the population estimate. Finally, as the estimate of the effect in the population was calculated by adding together all the adjusted estimates of each subpopulation, the variance of the estimate of the effect in the population was found by summing the adjusted variances for each subpopulation, as in Equation 6.

$$Var\left(E_{pop}\right) = \sum_{sub} Var\left(E_{sub}^{adj}\right) \tag{6}$$

Calculating the test statistic and p-value. The final test statistic is calculated as a z-score to be the ratio of the estimate of the effect in the population to the standard error of this estimate (i.e., the square root of the variance of this estimate). The statistic reveals

how likely it is that the differences in average scale scores between high-use and low-use groups, controlled for two other variables, is due entirely to chance.

It is only left to determine the probability of finding the value of this test statistic to be equal to or higher than the value found, if there is in reality no association between this treatment variable in the description of the use of word processors and achievement score. This study used the normal distribution to calculate this p-value. The normal distribution was used because the variance in the denominator of the test statistic was assumed to be estimated with enough precision to be considered known. Regardless of the quality of this assumption, the variability in the estimate of the standard error is surely small enough that a p-value calculated with the normal distribution assumption would be nearly identical to the corresponding p-value based on a t distribution with degrees of freedom that are not available for calculation from the NAEP Data Explorer.

Placing the results in the table. The z-score and the p-value calculated for the single data bundle were copied to the results table (template in Table 3). These values were placed into the cell at the intersection of the row representing the bundle's treatment variable and the column representing the bundle's pair of control variables.

Conclusion

This study was a secondary analysis of data from the 2011 National Assessment of Educational Progress (NAEP) Writing assessment to explore the relationship between academic achievement and the use of word processors in schools. The methodological strengths of this study come from the use of a large, high quality dataset and the use of a wide array of variables to describe the phenomenon. The NAEP dataset was used to avoid the too common methodological deficiencies in instructional technology research

because this dataset contains a large number of subjects, is ignorant of any specific word processing software, and uses materials that are ensured to be valid, unbiased, and reliable (National Assessment Governing Board, 2010a; "Research with NAEP Data," n.d.; Wu, 2005).

The statistical methods and the array of variables used in this study to analyze the data were designed to overcome the hurdles inherent in using the NAEP data that was publicly available. These efforts were beyond the significant processing that the public data receives by NAEP statisticians, including the creation of plausible values to reduce bias when used in secondary analysis ("NAEP Analysis and Scaling - Plausible Values Versus Individual Scores," n.d.; "NAEP Analysis and Scaling - Using Population-Structure Model Parameters to Create Plausible Values for Later Computation," n.d.).

The results obtained by this analysis can be used to construct a landscape of relationships between certain groups' use of specific word processing activities and that group's performance on NAEP writing subject test ("Cautions in Interpreting NAEP Results," n.d.; "Interpreting NAEP Writing results," n.d.). Causal relationships cannot be supported by this analysis, but patterns of relationships may lead future researchers towards areas where more experimental research would be of greatest value.

Chapter 4:

Findings and Analysis

This study is interested in the relationship between the use of word processers and student achievement. This relationship was investigated through a secondary analysis of data collected during the 2011 writing subject section of the National Assessment of Educational Progress (NAEP), the largest nationally sampled assessment of American students' skills in a variety of subjects, including writing ("NAEP Overview," n.d.). Using this dataset overcomes several methodological weaknesses common in the field of instructional technology research by including hundreds of thousands of subjects, remaining ignorant of specific software products, and using thoroughly validated instruments (NAEP Validity Studies Panel, 2002; National Assessment Governing Board, n.d.; O'Dwyer et al., 2005; Waxman et al., 2003; Zvacek, 1988). Data from the 2011 writing assessment is of particular interest because it significantly increased its focus on the role computers play in student writing and writing achievement, including conducting the assessment via word processors for the first time. The data was analyzed to answer two questions:

- To what extent is there a relationship between the level at which students use word processors in school and student achievement scores on the writing portion of the National Assessment of Educational Progress?
- What, if any, stated uses of word processers appear to correlate with higher student achievement?

The questions are answered by analyzing the differences between the mean scores of two groups of students: one that used a word processor in a particular way more often,

and one that used a word processor in the same way but less often. For each independent variable, the two groups of students are identified (the high-use students versus the low-use students) and the mean test score of each group is retrieved from the Main NAEP database. These two scores are contrasted and the difference between them is described as a z-score with a p-value. These results are collected into a results table (as in using the template in Table 3) for analysis.

This data answers the two research questions in three analyses. First, the analysis of the results table (template in Table 3) as a whole illustrates the extent of any general relationship between word processor use and achievement. The appearance of significant differences between mean scores throughout the table describes the quality of the relationship in question. Second, this description is refined by looking at the effects of the control variables in relationship to many of the treatment variables—seen by looking at columns in the table of results (template in Table 3). Strong effects within columns defined by a control variable indicate a significant interaction between that variable and the true relationship. Third, and of specific concern to the second research question, the effects of each treatment variable is analyzed when controlled for pairs of control variables. Strong effects within a row on the table of results (template in Table 3) suggest a strong relationship between a stated use of word processors and higher student achievement.

It is important to note that this process is actually calculated by subpopulations within each group rather than each group as a whole. This intermediate step uses the control variables to reduce any bias that may be introduced through secondary characteristics of the students in each group. This procedure is repeated for each

independent variable ten times, once for each pair of control variables defining subpopulations.

Subpopulations in the Sample

The Main NAEP database includes writing assessment information from approximately 150,000 students (National Center for Educational Statistics, 2009; "Selecting the samples for the 2007 Writing assessment," n.d.). Though no single student was asked to complete the entire subject assessment, plausible values were provided by NAEP to allow secondary analysis of groups of students ("NAEP Analysis and Scaling - Plausible Values Versus Individual Scores," n.d.). This study further controlled for bias by analyzing scores of the smallest groups possible—here called "subpopulations"—rather than in the sample as a whole. Subpopulations were defined by five control variables: gender, National School Lunch program eligibility, parent's education level, race/ethnicity, and school location. A total of 169 subpopulations were defined by all possible pairs of the values within all ten of the control variables.

When finding the difference between mean scores of low use and high use groups, a calculation central to the analysis, the difference in the two mean scores of these groups in each subpopulation was weighted according to the percentage of the whole sample represented by that subpopulation. These percentages were found through reports from the database, with each pair of control variables making one report. These percentages are shown in Tables 4 through 14.

Gender. The subpopulations defined by the pair of control variables including gender and National School Lunch program eligibility are shown in Table 4. Gender has two possible values (male and female) and there are three possible values for a student's

eligibility for the National School Lunch program (eligible, not eligible, and information not available). Pairing these values in all possible ways yields six subpopulations, including "male students who are eligible for the National School Lunch program" and "female students who are not eligible for the National School Lunch program." For those students for whom information is available regarding his or her eligibility for the National School Lunch program, the subpopulations are fairly evenly divided in the sample.

Table 4
Gender and National School Lunch Eligibility Subpopulations by Percentage

Gender	National School Lunch Program Eligibility	Percentage
Male	Not eligible	27
Female	Not eligible	26
Female	Eligible	21
Male	Eligible	21
Female	Information not available	3
Male	Information not available	3

Note: Percentages may not sum to 100 because of rounding
U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Urban and suburban school locations. The relative sizes of the subpopulations defined by gender and school location are shown in Table 5. While male and female students were evenly divided, two-thirds of the sample was identified as suburban or urban.

Table 5
Gender and School Location Subpopulations by Percentage

Gender	School location	Percentage
Female	Suburb	19
Male	Suburb	19
Female	City	14
Male	City	14
Male	Rural	12
Female	Rural	11
Female	Town	6
Male	Town	6

Note: Percentages may not sum to 100 because of rounding
U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Parents graduated from college. The subpopulations defined by the control variables of gender and parent education level are show in Table 6. Again male and female divisions of subpopulations are evenly divided, but over half of the sample has a parent who graduated from college. This is further illustrated by Table 7, which shows subpopulations defined by school location and parent education level.

Table 6
Gender and Parent Education Level Subpopulations by Percentage

Gender	Parent Education Level	Percentage
Male	Graduated college	27
Female	Graduated college	26
Female	Graduated high school	8
Female	Some education after high school	8
Male	Graduated high school	8
Male	Some education after high school	7
Male	Unknown	5
Female	Did not finish high school	4
Female	Unknown	4
Male	Did not finish high school	3

U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Table 7
School Location and Parent Education Level Subpopulations by Percentage

School Location	Parent Education Level	Percentage
Suburb	Graduated college	22
City	Graduated college	13
Rural	Graduated college	12
Suburb	Some education after high school	6
Town	Graduated college	6
Suburb	Graduated high school	5
City	Graduated high school	4
City	Some education after high school	4
Rural	Graduated high school	4
Rural	Some education after high school	4
City	Did not finish high school	3
City	Unknown	3
Suburb	Unknown	3
Rural	Unknown	2
Suburb	Did not finish high school	2
Town	Graduated high school	2
Town	Some education after high school	2
Rural	Did not finish high school	1
Town	Did not finish high school	1
Town	Unknown	1

U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Zero-percentage subpopulations. Subpopulations defined in part by race/ethnicity—including those also defined by gender (Table 8), school location (Table 9), and parent education level (Table 10)—present a new issue. In these tables several of the subpopulations represent close to zero percent of the sample, close enough that the report from the NAEP database rounds its percentage to zero. The appearance of these "zero-percentage" subpopulations seems to be related to the smaller minority races/ethnicities in the population. When these minorities are further split into even smaller subpopulations by being paired with unrelated values from another control

variable, it is not surprising that their percentage of the sample approaches zero. All of these zero-percentage subpopulations are collected into Table 11.

Table 8
Gender and Race/Ethnicity Subpopulations by Percentage

Gender	Race/Ethnicity	Percentage
Male	White	26
Female	White	25
Male	Hispanic	13
Female	Hispanic	12
Female	Black	6
Male	Black	6
Female	Two or more races	3
Male	Two or more races	3
Female	Asian	2
Male	Asian	2
Female	American Indian/Alaska Native	#
Female	Native Hawaiian/Other Pacific Islander	#
Male	American Indian/Alaska Native	#
Male	Native Hawaiian/Other Pacific Islander	#

Note: Percentages may not sum to 100 because of rounding, # rounds to zero
U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Table 9

School Location and Race/Ethnicity Subpopulations by Percentage

School Location	Race/Ethnicity	Percentage
Suburb	White	20
Rural	White	15
City	Hispanic	10
Suburb	Hispanic	10
City	White	9
Town	White	8
City	Black	5
Suburb	Black	4
Rural	Hispanic	3
Suburb	Two or more races	3
City	Asian	2
City	Two or more races	2
Rural	Black	2
Suburb	Asian	2
Town	Hispanic	2
Rural	Two or more races	1
Town	Black	1
Town	Two or more races	1
City	American Indian/Alaska Native	#
City	Native Hawaiian/Other Pacific Islander	#
Rural	American Indian/Alaska Native	#
Rural	Asian	#
Rural	Native Hawaiian/Other Pacific Islander	#
Suburb	American Indian/Alaska Native	#
Suburb	Native Hawaiian/Other Pacific Islander	#
Town	American Indian/Alaska Native	#
Town	Asian	#
Town	Native Hawaiian/Other Pacific Islander	#

Note: Percentages may not sum to 100 because of rounding, # rounds to zero

U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Table 10

Parent Education Level and Race/Ethnicity Subpopulations by Percentage

Parent Education Level	Race/Ethnicity	Percentage
Graduated college	White	33
Graduated college	Hispanic	8
Graduated high school	White	7
Some education after high school	White	7
Graduated college	Black	5
Graduated high school	Hispanic	5
Did not finish high school	Hispanic	4
Graduated college	Two or more races	4
Some education after high school	Hispanic	4
Unknown	Hispanic	4
Graduated college	Asian	3
Unknown	White	3
Did not finish high school	White	2
Graduated high school	Black	2
Some education after high school	Black	2
Did not finish high school	Black	1
Graduated high school	Two or more races	1
Some education after high school	Two or more races	1
Unknown	Black	1
Did not finish high school	American Indian/Alaska Native	#
Did not finish high school	Asian	#
Did not finish high school	Native Hawaiian/Other Pacific Islander	#
Did not finish high school	Two or more races	#
Graduated college	American Indian/Alaska Native	#
Graduated college	Native Hawaiian/Other Pacific Islander	#
Graduated high school	American Indian/Alaska Native	#
Graduated high school	Asian	#
Graduated high school	Native Hawaiian/Other Pacific Islander	#
Some education after high school	American Indian/Alaska Native	#
Some education after high school	Asian	#
Some education after high school	Native Hawaiian/Other Pacific Islander	#
Unknown	American Indian/Alaska Native	#
Unknown	Asian	#
Unknown	Native Hawaiian/Other Pacific Islander	#
Unknown	Two or more races	#

Note: Percentages may not sum to 100 because of rounding, # rounds to zero

U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Table 11

Control variable values defining subpopulations representing zero percent of the sample

Control Variable Value 1	Control Variable Value 2
Eligible for National School Lunch Program	American Indian/Alaska Native
Female	American Indian/Alaska Native
Male	American Indian/Alaska Native
School Lunch information not available	American Indian/Alaska Native
Not eligible for National School Lunch program	American Indian/Alaska Native
Parent education level Unknown	American Indian/Alaska Native
Parents Did not finish high school	American Indian/Alaska Native
Parents Graduated college	American Indian/Alaska Native
Parents Graduated high school	American Indian/Alaska Native
Parents had Some education after high school	American Indian/Alaska Native
School located in City	American Indian/Alaska Native
School located in Suburb	American Indian/Alaska Native
School located in Town	American Indian/Alaska Native
School locating in Rural	American Indian/Alaska Native
School Lunch information not available	Asian
Parent education level Unknown	Asian
Parents Did not finish high school	Asian
Parents Graduated high school	Asian
Parents had Some education after high school	Asian
School located in Town	Asian
School locating in Rural	Asian
School Lunch Information not available	Black
Eligible for National School Lunch Program	Native Hawaiian/Other Pacific Islander
Female	Native Hawaiian/Other Pacific Islander
Male	Native Hawaiian/Other Pacific Islander
School Lunch information not available	Native Hawaiian/Other Pacific Islander
Not eligible for National School Lunch program	Native Hawaiian/Other Pacific Islander
Parent education level Unknown	Native Hawaiian/Other Pacific Islander
Parents Did not finish high school	Native Hawaiian/Other Pacific Islander
Parents Graduated college	Native Hawaiian/Other Pacific Islander
Parents Graduated high school	Native Hawaiian/Other Pacific Islander
Parents had Some education after high school	Native Hawaiian/Other Pacific Islander
School located in City	Native Hawaiian/Other Pacific Islander
School located in Suburb	Native Hawaiian/Other Pacific Islander
School located in Town	Native Hawaiian/Other Pacific Islander
School locating in Rural	Native Hawaiian/Other Pacific Islander
School Lunch Information not available	Two or more races
Parent education level Unknown	Two or more races
Parents Did not finish high school	Two or more races
School Lunch Information not available	Parent education Unknown
School Lunch Information not available	Parents Did not finish high school
School Lunch Information not available	Parents Graduated high school

Note: Percentages may not sum to 100 because of rounding, # rounds to zero

U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Information not available. The subpopulations defined by eligibility for the National School Lunch program and school location (Table 12), parent education level (Table 13), and race/ethnicity (Table 14) illustrate one of the reasons NAEP data are valuable. The descending order of values in school location reflects that in Table 5, which is also defined in part by school location. The fact that the "information not available" value is clustered at the bottom indicates that only a very small percentage of students in the sample were missing background information.

Table 12
National School Lunch Eligibility and School Location Subpopulations by Percentage

National School Lunch Eligibility	School Location	Percentage
Not eligible	Suburb	23
Eligible	City	15
Eligible	Suburb	13
Not eligible	Rural	13
Not eligible	City	10
Eligible	Rural	9
Not eligible	Town	6
Eligible	Town	5
Information not available	City	2
Information not available	Suburb	2
Information not available	Rural	1
Information not available	Town	1

Note: Percentages may not sum to 100 because of rounding, # rounds to zero
U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Table 13

National School Lunch Eligibility and Parent Education Level Subpopulations by Percentage

National School Lunch Eligibility	Parent Education Level	Percentage
Not eligible	Graduated college	36
Eligible	Graduated college	13
Eligible	Graduated high school	10
Eligible	Some education after high school	8
Not eligible	Some education after high school	7
Eligible	Did not finish high school	6
Eligible	Unknown	6
Not eligible	Graduated high school	6
Information not available	Graduated college	4
Not eligible	Unknown	2
Information not available	Some education after high school	1
Not eligible	Did not finish high school	1
Information not available	Did not finish high school	#
Information not available	Graduated high school	#
Information not available	Unknown	#

Note: Percentages may not sum to 100 because of rounding, # rounds to zero

U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Table 14
National School Lunch Eligibility and Race/Ethnicity Subpopulations by Percentage

National School Lunch Eligibility	Race/Ethnicity	Percentage
Not eligible	White	35
Eligible	Hispanic	16
Eligible	White	13
Eligible	Black	8
Not eligible	Hispanic	8
Eligible	Two or more races	3
Information not available	White	3
Not eligible	Black	3
Not eligible	Two or more races	3
Not eligible	Asian	2
Eligible	Asian	1
Information not available	Hispanic	1
Eligible	American Indian/Alaska Native	#
Eligible	Native Hawaiian/Other Pacific Islander	#
Information not available	American Indian/Alaska Native	#
Information not available	Asian	#
Information not available	Black	#
Information not available	Native Hawaiian/Other Pacific Islander	#
Information not available	Two or more races	#
Not eligible	American Indian/Alaska Native	#
Not eligible	Native Hawaiian/Other Pacific Islander	#

Note: Percentages may not sum to 100 because of rounding, # rounds to zero
U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

Analysis of a Data Bundle

Each data bundle receives a custom report from the Main NAEP database (see Figure 5). This report includes information for each subpopulation defined by the two control variables and their values. Each subpopulation is divided into two groups, called "high use" and "low use" according to the data bundle's independent variable. The high use group contains students who more often use a word processor as described by the independent variable, and the second group contains students in the same subpopulation who less often use the word processor in that same way.

The data in the bundle is analyzed by finding the differences between the mean test score of each group within each subpopulation. These differences are weighted according to the percentage each subpopulation represents in the sample and then combined to find an "effect" of the independent variable controlled for two control variables. A similar procedure is used to find the variance and standard deviation of the effect. The final step in the analysis is to find the standardized ratio of the effect and the variance of the effect, calculated as a z-score.

The analysis of each data bundle was performed with a spreadsheet template, as illustrated in Figure 8. All subpopulations in the bundle are listed in rows with the first two columns (A-B) being the two control variables that define them. Column C contains the percentage that subpopulation represents in the sample, which is copied from the appropriate percentage report (see Figure 7). Information from the data bundle report (see Figure 5) is placed into the next four columns: D-E are the average scale score of the low-use group and its standard error, and F-G are the average scale score of the high use group and its standard error.

The remaining columns in the template are used for calculating the z-score for the data bundle. Column H calculates the difference between the average scores of the high use and low use groups in each subpopulation, and column I adjusts that difference by multiplying it by the decimal value of the percentage the subpopulation represents (that is, the value in column C divided by 100). Column J is the sum of all the weighted differences found in column I. This is the "effect" of the independent variable in this data bundle, or in other words, the increase or decrease in the average score of the high use

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Subpopulations			**Control Group**		**Treatment Group**		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	National School Lunch Program eligibility	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	1.71	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.80	**0.88**	**0.381**
Male	Eligible	21	125.22	1.10	124.66	0.93	-0.55	-0.12		1.21	0.87	2.08	0.44			
	Not eligible	27	150.73	1.01	151.65	1.21	0.93	0.25		1.02	1.48	2.50	0.67			
	Information not available	3	149.93	4.10	157.70	3.70	7.77	0.23		16.82	13.69	30.50	0.92			
Female	Eligible	21	143.94	1.03	144.67	0.89	0.73	0.15		1.05	0.79	1.84	0.39			
	Not eligible	26	169.74	0.95	172.71	1.04	2.97	0.77		0.90	1.09	1.99	0.52			
	Information not available	3	162.82	3.84	176.71	3.79	13.89	0.42		14.74	14.39	29.13	0.87			

Figure 8. Template used for analysis of a single data bundle. This bundle includes the control variables gender and National School Lunch eligibility. U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics (2011) *2011 National Assessment of Educational Progress (NCES_2012458)* [Data set]. Retrieved from https://nces.ed.gov/nationsreportcard/naepdata/.

group from the low use group. The effect is a description of the relationship between the independent variable and dependent variable when controlled for two control variables.

The variance of this effect, or more accurately the variance of the difference of means between low use and high use groups, is calculated similarly in columns K-O. First, the variance of mean scores for low use (column K) and high use (column L) groups are calculated by squaring the corresponding standard error. Column M calculates the variance of the difference in means for each subpopulation (here simply the sum of the two previous variances because no correlation between them is assumed), which are then adjusted in Column N according to the percentage (column C) of each subpopulation. The final variance of the effect, calculated in Column O, is the sum of all the adjusted values in Column N.

The final calculation is to find the ratio of the effect to the variance. This is calculated in Column P as the effect (Column J) divided by the square root of the variance (Column O). The result is a z-score describing the size of the effect of the independent variable for this data bundle in standardized terms. The probability of finding this z-score or higher is indicated by the p-value corresponding to the z-score, contained in Column Q. These two statistics—the z-score and p-value—are collected into Table 15 as a table of results.

The Full Results Table

The research questions are answered with a heuristic analysis of the full table of results (Table 15). This table contains the 150 outcomes of the analysis of the data bundles. Each outcome consists of a z-score and associated p-value. Each data bundle included one independent variable and two control variables. The table's columns

Table 15
Results of Bundle Analyses

Variable	Gender and School Lunch		Gender and School Location		Gender and Parent Education		Gender and Race/ Ethnicity		School Lunch and School Location		School Lunch and Parent Education		School Lunch and Race/ Ethnicity		School Location and Parent Education		School Location and Race/ Ethnicity		Parent Education and Race/ Ethnicity	
	Z	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*
Student action logs																				
Paste Function	-2.04	0.041	-1.77	0.077	-1.52	0.129	-1.27	0.203	-1.65	0.100	-1.75	0.080	-1.40	0.160	-0.99	0.322	-0.75	0.455	-0.52	0.605
Backspace Key	15.32	0.000	12.91	0.000	14.48	0.000	13.67	0.000	11.72	0.000	14.90	0.000	13.56	0.000	10.95	0.000	10.99	0.000	11.55	0.000
Delete Key	3.79	0.000	4.71	0.000	3.24	0.001	3.87	0.000	2.72	0.006	2.38	0.017	2.92	0.004	2.76	0.006	2.65	0.008	2.39	0.017
Spell Checking Function	-4.49	0.000	-4.53	0.000	-4.79	0.000	-3.98	0.000	-2.98	0.003	-3.38	0.001	-3.07	0.002	-3.00	0.003	-2.78	0.005	-2.71	0.007
Thesaurus Function	6.23	0.000	5.69	0.000	5.00	0.000	5.82	0.000	4.90	0.000	4.87	0.000	5.41	0.000	4.23	0.000	4.70	0.000	4.19	0.000
Teacher questionnaire																				
Complete Writing Started by Hand	4.11	0.000	4.63	0.000	5.10	0.000	4.76	0.000	2.61	0.009	3.41	0.001	3.15	0.002	3.08	0.002	2.94	0.003	2.99	0.003
Draft and Revise	4.17	0.000	4.69	0.000	4.93	0.000	4.65	0.000	2.74	0.006	3.39	0.001	3.09	0.002	3.21	0.001	3.07	0.002	3.07	0.002
Check Spelling	3.12	0.002	3.71	0.000	4.07	0.000	3.84	0.000	-0.01	0.993	-0.01	0.989	2.36	0.018	2.47	0.014	2.43	0.015	2.40	0.017
Availability for Writing Instruction	0.88	0.381	1.05	0.294	1.30	0.195	0.68	0.499	0.38	0.702	0.45	0.650	0.26	0.791	0.58	0.561	0.36	0.716	0.37	0.714
Student questionnaire																				
For School Assignments	4.60	0.000	4.29	0.000	4.06	0.000	4.87	0.000	3.48	0.001	3.83	0.000	4.34	0.000	3.09	0.002	2.65	0.008	3.40	0.001
From the Beginning	4.74	0.000	4.95	0.000	4.51	0.000	5.02	0.000	3.03	0.002	3.17	0.002	3.58	0.000	2.86	0.004	3.02	0.002	-0.52	0.605
To Complete Paper	11.53	0.000	11.43	0.000	11.49	0.000	10.83	0.000	7.82	0.000	8.95	0.000	8.41	0.000	7.19	0.000	7.77	0.000	7.20	0.000
To Make Changes	9.03	0.000	9.03	0.000	8.80	0.000	8.81	0.000	6.51	0.000	7.29	0.000	6.97	0.000	6.16	0.000	-0.75	0.455	5.97	0.000
To Organize 1st Writing Task	4.50	0.000	4.10	0.000	4.85	0.000	4.11	0.000	2.88	0.004	3.78	0.000	3.15	0.002	3.06	0.002	2.70	0.007	2.88	0.004
To Organize 2nd Writing Task	3.84	0.000	3.42	0.001	4.07	0.000	3.41	0.001	2.38	0.017	2.99	0.003	2.55	0.011	2.49	0.013	2.22	0.026	2.30	0.022

Note: α=.001

represent the pairs of control variables while the rows represent the independent variables.

Results table columns. Columns on the full results table (Table 15) organize the control variables. There are ten major columns and each major column is divided into two minor columns. Each major column represents one pair of control variables used to create a data bundle. The two minor columns within each major column hold the z-score and p-value, respectively, that are the outcomes of a data bundle analysis. By looking down an entire column, one can see how all the independent variables are related to the dependent variable, that is, how each type of use of word processors is related to achievement score, while being controlled for a single pair of control variables.

Results table rows. Rows on the full results table (Table 15) organize the independent variables. There are 15 rows, each representing one of the uses of word processors. Looking across an entire row at the pairs of z-scores and p-values illustrates how one of the independent variables is related to achievement score in terms of all possible pairs of control variables.

The outcome of each data bundle analysis is placed on the table (Table 15) in relation to its independent and control variables. Remember that each data bundle was defined by one independent variable and two control variables. The outcome of a data bundle analysis is placed on the table (Table 15) at the intersection of the row representing the independent variable and the major column representing the pair of control variables. The two components of the outcome—a z-score and associated p-value—are placed in the minor columns within the major column.

Interpreting the Outcomes of a Data Bundle Analysis

The z-score outcome of the data bundle analysis acts as an indicator of the direction and size of the effect. The sign denotes the direction of the effect, with positive numbers signifying the high use group had a greater mean score and negative numbers signifying the low use group had a greater mean score. The size of the effect is described by the statistic itself. Though not regularly thought of as an "effect size" statistic, a z-score describes the size of the change found in the data bundle in standardized terms. This study used the z-score to compare the results of analyses across data bundles.

High z-scores and low p-values. Even a cursory review of the final results table (Table 15) will find a great number of abnormally high z-scores with very low associated p-values. This is an effect of the very large sample size included in the NAEP data. When a group's mean score is reported, the large sample size means that the standard error reported with that mean score is often quite small. Since the z-score is a ratio of the effect of the independent variable and the variance of that effect, the low variance indicated by the standard error can increase the z-score by orders of magnitude. Of course, z-scores well above the usual range of such statistics have p-values that are correspondingly low, since the probability of finding such a high z-score is quite low.

It is important to understand that these circumstances cause even small differences in mean scores to be statistically significant. This is not to say that the z-scores are inaccurate or less useful to this study's interpretation of results. This study, however, attempts to avoid overstating the strength of these indicators of relationships and reduces the significance level α to .001—the lowest conventional level—to reflect these considerations.

Research Question 1

The first questions asks, "To what extent is there a relationship between the level at which students use word processors in school and student achievement scores on the writing portion of the National Assessment of Educational Progress?" This question is concerned with how different levels of word processing use in general is related to achievement score. This information is best found by examining columns on the full results table (Table 15). While rows on this table on concerned with relationships between specific independent variables and tests scores, columns are more concerned with reducing bias in descriptions of the relationship between the use of word processors and student achievement.

Interpreting the table as a whole. Looking first at Table 15 as a whole, the z-scores are centered on a mean of 3.78 (median=3.40) but spread out over a wide range (min=0.01, max=15.33, SD= 4.01). On the other hand, 55% of the z-scores are statistically significant (α=.001). Here we see the effect of NAEP's large sample size. These statistics might lead one to expect to find large differences between the mean test scores of high use and low use groups, but this is not always the case. The results of the analysis of the data bundle defined by the independent variable "using a computer to write for school assignments," and two control variables "National School Lunch Program eligibility" and "parent education level" are close to the average with a z-score of 3.83 ($p<.001$). Looking at the actual mean test scores of the high use and low use groups of students, we find a real score difference of only 7.55 points on a scale ranging from 0 to 300 points, or a change of only about 5% of the mean score of the whole low use group (141.79).

This effect encourages cautious interpretations. Large z-scores may seem at first to indicate very strong relationships between the use of word processors and student achievement. With the effect of the very large sample size of NAEP, the scores of the table overall more likely indicate a smaller, yet significant and persistent relationship between the use of word processors and student scores on the writing subject portion of NAEP. Looking more closely at the major columns of the full result table (Table 15) can refine this initial finding.

Interpreting columns in the results table. Each major column in Table 15 represents one pair of control variables. Examining these columns individually as well as in groups with control variables in common will shed additional light on the general relationship between word processing and student achievement, which is the concern of the first research question. All columns are described individually in Table 16. None of the individual columns reveal vastly different characteristics. Again, this supports the general interpretation of the table as a whole.

Table 16
Descriptive statistics of z-scores by control variable pairs

Control variable 1	Control variable 2	Mean	Median	Min	Max	*SD*	Number of significant values
Gender	National School Lunch Eligibility	4.62	4.17	-4.49	15.32	4.69	12
Gender	School Location	4.55	4.63	-4.53	12.91	4.29	13
Gender	Parent Education Level	4.64	4.51	-4.79	14.48	4.49	12
Gender	Race/Ethnicity	4.60	4.65	-3.98	13.67	4.22	13
National School Lunch Eligibility	School Location	3.10	2.74	-2.98	11.72	3.55	5
National School Lunch Eligibility	Parent Education Level	3.62	3.39	-3.38	14.90	4.27	9
National School Lunch Eligibility	Race/Ethnicity	3.68	3.15	-3.07	13.56	3.85	6
School Location	Parent Education Level	3.21	3.06	-3.00	10.95	3.16	4
School Location	Race/Ethnicity	2.75	2.65	-2.78	10.99	3.25	3
Parent Level of Education	Race/Ethnicity	3.00	2.88	-2.71	11.55	3.33	5

Gender. The four columns in Table 15 defined in part by gender have similarities worth noting. First, they are characterized by high z-scores. These columns have the four largest means and medians, and three of the four largest values in the table. Second, they share the broadest variability, with three of the four largest standard deviations and the four lowest minimum values (in contrast to having the highest values as well). Finally,

these four columns contain 50 of the significant p-values ($p<.001$), while the other six columns together contain only 32 significant p-values.

These qualities indicate there is something significant about the relationship between gender and achievement that interferes with the measurement of the relationship between word processing and achievement. When the relationship between word processing and student achievement is controlled for gender, the relationship becomes much more pronounced. This supports the general conclusion that there is a significant relationship between using word processors and student scores on the NAEP writing test.

National School Lunch eligibility. A student's eligibility for the National School Lunch program is based on the student's family's income and thus is associated with socio-economic status. After gender, eligibility for the National School Lunch program defines the four columns that include the greatest number of significant z-scores (32 z-scores with $p<.001$). Further, these columns have three of the top five largest z-scores. While not as prominent as the interference of gender, a student's eligibility for the National School Lunch program does appreciably interfere with the measurement of the relationship between the use of word processors and test scores. The fact that this relationship is strengthened when the effects of socio-economic status are mitigated supports the general conclusion that there is a significant and persistent relationship between the use of word processors and NAEP test scores.

School location. The columns defined by school location indicate this variable may have the least interference with the measurement of the true relationship between word processing and student achievement. These columns are characterized by lower z-scores, with three of the four lowest mean z-scores, and much less variability, with three

of the four lowest standard deviations as well as four of the five lowest maximum values and three of the four highest minimum values. Though these columns do not lend much support to the general conclusion that there is a significant and persistent relationship between the use of word processors and student test scores, they do nothing to contradict that general conclusion.

Parent education level. By itself, parent education level does not follow a clear pattern among the four columns it defines. The single column defined by parent education level and gender, however, has the highest mean z-score, the lowest minimum z-score, and the second largest number of significant values.

Race/ethnicity. Like parent education level, race/ethnicity appears to have less interaction with the independent variables. The columns defined in part by race/ethnicity are more affected by the control variable paired with it.

Question 1 Conclusion. Heuristic analysis of the results table (Table 15) as a whole and of the major columns on the results table suggests that there is a significant, persistent, and positive relationship between students using word processors in academic work and scores on the 2011 writing portion of the National Assessment of Education Progress. The generally high z-scores throughout Table 15 indicate a strong relationship between word processing and writing achievement. Further, the changes in z-scores related to different control variables indicate an underlying relationship being affected by the control variables. Gender and National School Lunch eligibility are important control variables. Gender is highly interactive with the measurement of the relationship between word processing and achievement. Eligibility for the National School Lunch program is also interactive, though less so than gender. School location, parent level of education

and race/ethnicity have much less interactivity with the measurement of the relationship between word processing and student achievement. The large effect sizes suggested by the high z-scores, however, are mitigated by acknowledging the impact of the very large size of the NAEP dataset sample.

Research question 2

The second research question asks, "What, if any, stated uses of word processers appear to correlate with higher student achievement?" This research question is concerned with what specific uses of word processors in academic work are more strongly related to student scores on the writing portion of the National Assessment of Educational Progress. This information is best found by examining the rows on the full results table (Table 15). Where the columns were concerned with the general relationship between word processing and writing achievement, the rows are concerned with how each specific independent variable, the variables that describe the use of word processors, is related to the dependent variable, the score on the writing portion of NAEP, when controlled for different sets of control variables. All rows are statistically described in Table 17.

Table 17
Descriptive statistics of rows in the results table concerning independent variables

Independent Variable	Mean	Median	Min	Max	*SD*	Number of significant values
Student action logs						
Backspace Key	13.01	13.24	10.95	15.32	1.55	10
Delete Key	3.14	2.84	2.38	4.71	0.72	4
Paste Function	-1.37	-1.46	-2.04	-0.52	0.46	0
Spell Check Function	-3.57	-3.23	-4.79	-2.71	0.76	5
Thesaurus Function	5.10	4.95	4.19	6.23	0.64	10
Teacher questionnaire						
Availability for Writing Instruction	0.63	0.52	0.26	1.30	0.32	0
Check Spelling	2.44	2.45	-0.01	4.07	1.37	3
Complete Writing Started by Hand	3.68	3.28	2.61	5.10	0.85	5
Draft and Revise	3.70	3.30	2.74	4.93	0.78	5
Student questionnaire						
For School Assignments	3.86	3.94	2.65	4.87	0.67	8
From the Beginning	3.44	3.37	-0.52	5.02	1.55	5
To Complete Paper	9.26	8.68	7.19	11.53	1.76	10
To Make Changes	6.78	7.13	-0.75	9.03	2.76	9
To Organize 1st Writing Task	3.60	3.46	2.70	4.85	0.72	5
To Organize 2nd Writing Task	2.97	2.77	2.22	4.07	0.64	4

Backspace key. The most convincing evidence of a significant, persistent, and positive relationship between word processing and writing achievement is associated with use of the backspace key. This data was collected as part of the student action computer logs and represents the number of times a student used the backspace key while crafting writing samples as part of the NAEP writing assessment. This number is the average use by a student after crafting two writing samples. This row measures the difference in the mean score between students who used the backspace key 300 times or less (low use group) and students who used the backspace key more than 300 times (high use group).

This row is important because its z-scores are notably higher than other rows. Not only does this row have the highest mean as well as the highest z-score in Table 15, its minimum value comes close to exceeding the maximum value of all other rows. Further, it is one of only three rows to contain only significant values. Though this row had one of the higher standard deviations, its variability is not particularly noteworthy.

These consistently high z-scores clearly indicate a significant relationship between using the backspace key and NAEP writing test score. Even taking into consideration the effect of the very large sample size, using the backspace key is associated with consistently large z-scores for all control variables.

Delete key. Ostensibly related to the use of the backspace key, the results of the bundle analyses relating to the delete key indicate a more moderate relationship between word processing and writing achievement. Though only four of its z-scores are significant (α=.001), the four columns defined by the gender control variable, those four p-values range from .001 to .000003. These are levels of significance that suggest a functioning relationship between use the delete key and writing achievement score.

Relative to the other independent variables, the z-scores and p-values in this row are near the middle of the effect sizes. Relative to the use of the backspace key, however, the effect sizes of the delete key are, perhaps surprisingly, small. The use of the delete key during the creation of writing sample was reported in the NAEP database quite differently as well. While the high use group used the backspace key more than 300 times in one writing sample, the high group used the delete key one or more times.

NAEP documentation reports that "[t]he backspace and delete keys are located on the keyboard" as well as accessible through the menus using the mouse ("NAEP - 2011

Writing- Writing Tools," n.d.). Unfortunately, the author could not find any information about the hardware keyboards used by students to write samples. It is interesting to note that international standards regarding keyboard layout (INCITS 154-:1988[S2009]) have smaller keyboards, like those used for laptops, include a physical key labeled "backspace" but not one labeled "delete." Of course, not all keyboards conform to these standards. For example, Apple keyboards have a physical key labeled "delete" that actually functions as a backspace key rather than as a forward delete key. There is a legitimate question about what would be logged if a student using an Apple keyboard presses the key labeled "delete." The report from the NAEP Technology-Based Assessment Project did note that use of NAEP-provided laptops was associated with lower assessment scores when compared to students using their school's computers, and suggested that the smaller and less familiar keyboards may have been one of the factors (Sandene et al., 2005).

Paste function. Use of the paste function appears to have no relationship with writing achievement score. Though all of the z-scores in that row are negative, none are significant values. Like the delete key, the paste function was used very little while creating writing samples; the high use group is defined as those students who used the paste function two or more times, averaged across two writing samples. The paste function was available through the mouse-based menu, but it was unlikely that the keyboard possessed a key labeled "paste."

Spell check function. The spell check function was available to students through the main on-screen menu or through the right-click context menu. The use of the spell check function was the only variable with statistically significant negative z-scores,

meaning that the low use group of students had a higher mean score than the high use group and that greater use of the spell check function is related to lower test scores. The paste function also had several negative z-scores, but none of them had p-values below .001. In terms of effect size, the mean of the z-scores in the row associated with the use of the spell check function was about the same size as several of the rows, but in the opposite direction. Comparing this row with the row concerning how often teachers asked students to use the spell check function, the two means of the z-scores in each row are similar but opposite. The p-values, however, are quite different. The p-values indicating significance in the latter row are .0002, .00005, and .0001, while the p-values in the former row, the use of spell check during the NAEP assessment are orders of magnitude lower: .000007, .000006, .000002, .00007. Both sets of p-values are very low, but in comparison the z-scores associated with the use of spell check during the NAEP assessment are more convincing than those associated with teachers asking students to use spell check.

Thesaurus function. In opposition to the use of the spell check function, the use of the thesaurus function during the NAEP writing assessment was strongly and positively related to test scores. Only three rows had a mean z-score higher that those of the thesaurus function, and it was one of three variables to have only significant values in the row. Even though the maximum value in this row ranks near the middle of maximum values in rows, the low value of this row is the third highest, and the standard deviation is one of the lowest. The frequency of use was also similar to the spell check function, with the high use group using the thesaurus function two or more times, as opposed to the high use group using the spell check function three or more times.

Availability of computers for writing instruction. The teacher-reported availability of computers for writing instruction was by far the variable least indicative of a relationship between word processing and test score. There were no significant values in this row and the mean value of the z-scores was only 26% of the next higher value. The high use group, defined here as having more available computers, had a student/computer ratio of 3/1 or lower.

Teacher asking students to use spell check. The frequency with which teachers ask students to use the word processor to check the spelling in their writing, as reported by teachers, has only three significant z-scores and one of the lower mean z-score values. The mean score is nowhere near the lowest mean z-score, which is in the row concerning the frequency students were recorded using the spell check function during the NAEP assessment. In fact, the z-scores on this row are almost as positive as the other row associated with the spell check function is negative, and is much more significant than the row with the next lower mean z-score. This suggests that the teacher asking students to use spell check is moderately related to increasing test scores, while the actual use of spell check is more strongly related to decreasing test scores.

Teacher asking to complete paper started by hand. The frequency with which teachers have students use a word processor to complete writing started by hand is convincingly related to test scores. The z-scores associated with this row are high and five are significant values, though they are not conspicuously higher than the rest of the z-scores on Table 15. This row is very similar to the student-reported variable of the frequency with which they start writing a paper on the word processor and the teacher-reported frequency with which they ask students to draft and revise a paper.

Teacher asking to draft and revise. The row is notably similar to the row above, asking students to complete a paper started by hand. This is perhaps not surprising since the revising portion of this assignment would normally be associated with finishing the paper. This row's five significant z-scores and relatively low standard deviation suggests there is a relationship between this variable and test scores, though not one unusually strong when compared to other variables in this study.

Student use for school assignments. This is the student-reported variable that most closely asks about the general relationship between the use of word processors in academic work with student writing test scores. The z-scores in this row are at the top of the moderately high values. There is a discrete jump in mean z-score between this row and the row with the next higher mean, but this row is ranked higher than most in terms of mean z-score and eight of its ten z-scores are significant values. This supports the inferences drawn from the analysis of columns suggesting that there is a significant, positive, and persistent relationship between using word processors in academic work and writing achievement scores.

Student use from the beginning. The student-reported task of using word processors from the beginning when writing a paper is moderately related to writing test scores. When all independent variable rows are ranked according to mean z-score, this row falls near the middle and within a group of four rows with five significant values in each and mean z-scores differing by only 0.26. All significant values are highly significant, with the largest significant p-value being 0.0000005 (5*10-7).

Student use to complete a paper. The third of the three variables to have all significant values in its row is the frequency with which students use a word processor to

complete a paper. The questionnaire item does not specify how the student started writing the paper. Other than the use of the backspace key, this row had the highest mean z-score, the highest minimum value, and the highest maximum value. It also had the second highest standard deviation of all the rows. These qualities suggest a strong relationship between a student completing a paper with a word processor and higher scores on the NAEP writing test.

Student use to make changes. Another independent variable with a strong relationship to writing test score, and also reported by students, is the frequency with which students use a word processor to make changes to a paper. It is important to note that the item on the student questionnaire includes in parentheses "for example, spell-check or cut and paste" at the end of the question (Table 2). This addition makes what may have been considered a very general question about the writing process into a question specifically about using the word processing tools to edit the text. This variable did have one negative z-score, but with a p-value of .455 it is highly insignificant. Using a word processor to make changes had the third highest mean value of any row's z-scores as well as nine significant values. This variable also had the two smallest p-values: 3.06*10-13 and 3.13*10-12. Even taking the very large sample size of the NAEP test, these are very low p-values.

Organize writing tasks. Two items on the student questionnaire asked the student if he or she did "use the computer to make notes, plan, or organize your writing" for each of the two writing samples students wrote during the NAEP test (Table 2). Since both rows on the table associated with these two variables are very similar, any contrasts between them could provide useful insights for interpreting the results. The z-scores

related to using the computer to organize the second writing task are consistently smaller then for the first writing task, but not by very much. The difference in their mean z-score is only 0.65, the difference in their minimum z-score is only 0.48, and the difference in their maximum z-score is 0.78. Assuming that a student who uses the computer to organize the second writing task also used the computer to organize the first writing task, these differences may suggest a scale on which the differences between rows could be measured. Assuming that there is significant overlap in the students in the high use group for these two variables and thus a significant overlap in test scores, a difference in mean z-score of 22% (here 0.65) perhaps should not be considered an important difference. If this measure were applied to the mean value of the z-scores on each row, the eight rows with middle-ranked mean values might not be considered important. When all rows are ranked by mean value of z-scores, the difference in means between the fifth row and the tenth row is only 0.72. Of course, the two rows associated with the organization of the first and second writing tasks are within that six-row span.

Categorizations. Categorizing these variables in different ways leads to other insights. If all variable rows are grouped on the scale introduced above by the two items concerning organization of writing tasks, four distinct groups emerge, as shown on Table 18.

Table 18

Independent variables grouped by proximity of mean value of z-scores. Variables are grouped when the difference between mean z-score values is less than 0.65.

Independent Variable	Mean	Mean-0.65
Strong relationships		
Backspace Key	13.01	12.36
To Complete Paper	9.26	8.61
To Make Changes	6.78	6.13
Thesaurus Function	5.10	4.45
Moderate relationships		
For School Assignments	3.86	3.21
Draft and Revise	3.70	3.05
Complete Writing Started by Hand	3.68	3.03
To Organize 1st Writing Task	3.60	2.95
From the Beginning	3.44	2.79
Delete Key	3.14	2.49
To Organize 2nd Writing Task	2.97	2.32
Check Spelling	2.44	1.79
Weak or no relationships		
Availability for Writing Instruction	0.63	-0.02
Paste Function	-1.37	-2.02
Negative relationships		
Spell Check Function	-3.57	-4.22

Another categorization could be the number of significant values in a row. Independent variables are thus grouped by the number of significant values associated with each. As shown in Table 19, the division between moderate and weak relationships is less clear, but the strongest relationships are still distinct. Perhaps not surprisingly, the variable's ranking according to the number of significant values is often the same as its ranking according to average effect size, here considered the absolute value of the variable's mean z-score.

Table 19
Independent variables grouped by the number of associated significant values

Independent Variable	Number of significant values	Mean
Strong relationships		
Backspace Key	10	13.01
To Complete Paper	10	9.26
Thesaurus Function	10	5.10
To Make Changes	9	6.78
For School Assignments	8	3.86
Moderate relationships		
Draft and Revise	5	3.70
Complete Writing Started by Hand	5	3.68
To Organize 1st Writing Task	5	3.60
From the Beginning	5	3.44
Spell Check Function	5	-3.57*
Weak or no relationships		
To Organize 2nd Writing Task	4	2.97
Delete Key	3	3.14
Check Spelling	3	2.44
Availability for Writing Instruction	0	0.63
Paste Function	0	-1.37

Note: *Though the effect is negative, the effect size is the absolute value of the z-score

The final way to group the independent variables is by writing mode, or place in the writing process. These groups in Table 20 are very subjective, but serve to investigate if there are relationships between more general types of word processer use and NAEP writing test score. The revising stage of the writing process contains independent variables with slightly higher mean z-scores and contains somewhat more significant values than other categories. More interesting, though, is the fact that the strongest relationships are evenly distributed across three of the five modes.

Table 20
Independent variables grouped by mode or place in the writing process

Independent Variable		Mean	Number of significant values
General use			
	For School Assignments	3.86	8
	Availability for Writing Instruction	0.63	0
Pre-writing and initial composition			
	To Organize 1st Writing Task	3.60	5
	From the Beginning	3.44	5
	To Organize 2nd Writing Task	2.97	4
Revising			
	To Complete Paper	9.26	10
	To Make Changes	6.78	9
	Draft and Revise	3.70	5
	Complete Writing Started by Hand	3.68	5
Editing			
	Backspace Key	13.01	10
	Delete Key	3.14	3
	Check Spelling	2.44	3
	Paste Function	-1.37	0
Tools			
	Thesaurus Function	5.10	10
	Spell Check Function	-3.57	5

Question 2 Conclusion. Heuristic analysis of the rows of the full results table (Table 15) yields several conclusions. Clearly, the use of the backspace key during the NAEP writing assessment is strongly related to scores on the NAEP writing assessment. Using a computer to complete a paper and to make changes to a paper are also strongly related to NAEP score. At the other end, use of the spell check function during the NAEP test is moderately but negatively related to NAEP score. Use of the paste function during the NAEP test and the availability of computers for writing instruction had no relationship to score. The rest of the variables could be categorized as having a moderate

relationship to NAEP writing test score. It should be remembered that what this study calls “moderate” would normally be called ”very strong” so these variables should not be dismissed. The size of the effect of these uses of word processors is here moderated by the effects that the very large sample size has on standard errors and thus on z-scores and p-values. Categorization of the variables in different ways confirms the demarcation of variables into those with moderate and strong relationships with higher achievement scores. These alternative groupings provide even more support to the conclusion that there are four variables that appear to strongly correlate with higher student achievement: using the backspace key, using a computer to complete a paper, using a computer to make changes to a paper, and using the thesaurus while writing.

Chapter 5:

Discussion

This study investigated the relationship between word processing and student achievement through a secondary analysis of data collected from the National Assessment of Educational Progress (NAEP) 2011 writing assessment. This data was analyzed in data bundles, each controlling for two variables through the use of subpopulations, resulting in a table (Table 15) containing 150 z-scores with their corresponding p-values. These results describe the differences in test score that can be related to the use of word processors. This table was heuristically analyzed to find patters of results that indicate answers to the two research questions:

- To what extent is there a relationship between the level at which students use word processors in school and student achievement scores on the writing portion of the National Assessment of Educational Progress?
- What, if any, stated uses of word processers appear to correlate with higher student achievement?

Summary of findings related to the first research question

The results table (Table 15) as a whole strongly suggests that there is a significant, persistent, and positive relationship between the level at which students use word processors and their achievement scores of the NAEP 2011 writing assessment. More than half of the z-scores on the table were significant values, even when $\alpha=.001$. Though some of this can be attributed to the effects of the very large sample size used by NAEP, the generally high z-scores strongly indicate a relationship. Controlling for

gender, and to a lesser extent, eligibility for the National School Lunch program, revealed the clearest evidence for this conclusion.

Summary of findings related to the second research question

This question was answered by examining the rows on the full results table (Table 15) to find patterns in the relationships between specific uses of word processors and achievement score. Most of the specific uses of word processors had a modest relationship to NAEP score, but four strongly correlated to NAEP score: using the backspace key, using a computer to complete a paper, using a computer to make changes to a paper, and using the thesaurus. The use of the spell check function was negatively related to NAEP scores. The use of the paste function and the availability of computers for writing instruction had no relationship to score.

Context of findings

Quality of methods and data. This study distinguished itself by the high quality of data and data analysis used to answer the research questions. Much of the literature in the area of the effects of instructional technology relies on small samples, biased instruments, and unclear definitions (Waxman et al., 2003). Those that do provide suitable results are often too old to apply with confidence to the current generation of users and word processors (Morphy & Graham, 2012).

NAEP data. The databases created and maintained by the National Center for Educational Statistics (NCES)—of which the Main NAEP database is the largest—can be of immense value to researchers looking for answers about instruction in many fields (Haertel, at al., 2012). Preserving data is neither simple nor inexpensive, but the NCES and NAEP are known for their dedication to preserving and distributing data explicitly

for researchers answering new questions (Glass, 1976). This data is collected with carefully created instruments and oversight to ensure it is unbiased and valid, and NAEP statisticians prepare the data especially for sound secondary analysis ("NAEP Analysis and Scaling - Using Population-Structure Model Parameters to Create Plausible Values for Later Computation," n.d.). In this way, NAEP data is available to be used by researchers to improve the data and methods of educational research in many ways.

Subpopulations to reduce bias in observational studies. This study, like almost all studies in the field of education, is an observational study (Cochran & Chambers, 1965). Many studies in the field of education, however, do not recognize this fact, though several authors have suggested changing this would be a good way of improving the reputation of educational technology research (Kaestle, 1993; Sroufe, 1997). This study reduced the bias inherent in observational studies by disaggregating its analyses into the smallest level possible: subpopulations of students defined by two control variables. Subpopulations are useful because they are sets of background covariates that would otherwise be difficult to untangle from the true relationship being investigated (Ho et al., 2007).

Word processing changing the writing process. There is general agreement that the way word processing could significantly impact the quality of a student's writing is by changing the way a writing sample is revised and edited. It is clear that word processors make text more fluid; the text can easily be moved, changed, added to, and removed without needing to rewrite the entire manuscript (Dave & Russell, 2010). Only a few researchers (see Harris, 1985; Schanck, 1986) have found no significant difference in the revising between groups using word processors and writing by hand. This study

also indicates that there is a relationship between using a word processor's tools for revising and editing.

This study does conflict somewhat with the idea that word processor tools encourage lower-level edits and thus do not improve writing. Collier (1983) argues that word processors encourage the writer to focus on low-level editing in small passages of text and discourage the writer from focusing on structural changes in larger passages. Sudol (1989) agrees that word processors make editing easier, but doubts that word processors could help students learn where those edits need to be made. This study, however, found that the word processing tool with the strongest relationship to achievement score was using the backspace key more often. This is in conflict because the backspace key is generally used to remove one letter at a time, the smallest edit possible. The backspace key can also be used to delete larger, highlighted sections of text, but the backspace key is never a sophisticated tool for revision. Studies have concluded that counting the number of edits or revisions without regard to its level of change does not accurately measure the impact that word processors have on the quality of writing (Lutz, 1987; Zvacek, 1988).

The results also confirm—more so than most studies—the idea that word processors can be part of a higher quality of student writing. This study does not, however, contradict the idea that these improvements in writing are simply the reflection of good writing habits. Collier and Werier published a study where proficient writers who used word processors were asked to compose by hand, concluding, "Good writers are good writers, no matter how they write" (Collier & Werier, 1995, p. 56).

The new generation of technology and users. This study was conducted in a vastly different context than much of the literature in this area. Of the hundreds of studies of the impact of word processors on student writing, over half of these studies were published before computers were widespread in classrooms (Goldberg et al., 2003). This context is important because the way students interact with word processors, and the way word processors can affect the writing process, has changed dramatically. For example, Lutz (1987) based the interpretation of results on the fact that word processors could only display a few lines of text at the same time, and Jacoby (1984) concluded that the longer length of essays written on word processors could be due to the removal of the "end of page effect" where students tend to end essays at the bottom of a page. Word processors of 2015 are very different. They can display as many lines of text as the author desires and clearly shows where the end of the page will be when the writing is printed.

This study, however, does not contradict the hypothesis found elsewhere that writing scores will improve as students become more comfortable with computers and word processors. Crafton (1996) found basic writers lacking in computer skills encounter significant difficulties when writing in a computerized environment, and Markel (1994) reported that students who have become more comfortable with a computer have more positive experiences writing with a word processor.

What this study does support is the idea that word processing continues to be an important part of writing instruction. In fact, it could be argued that the malleability and flexibility of text—the hallmark of digital media—increases as word processing becomes a tool so fundamental that it becomes almost invisible. As a previous generation could not imagine a writing classroom that did not include pencils or ink, today's and

tomorrow's generations will use the word processor as a means of expanding writing instruction into new areas of collaboration, publishing, and interconnecting deeply with other writing. This document itself has struggled with the need to cite sources that are "unpublished" in a traditional sense and might easily be changed between this writing and the next reading without any trace of previous "editions." Understanding how the next generation interacts with text for collaboration and self-expression, an understanding this study contributes to, will improve the ability of educators to assist students in exploring digital rhetoric.

Interpretation of findings

Backspace key. Those data bundles that included the use of the backspace key during the creation of writing samples for the NAEP assessment yielded extremely high z-scores, much higher than other variables in the study. Since this is not what would be predicted on the basis of most studies of word processors—thinking that the low level edits made with the backspace key would not be associated with higher results—the strong correlation between this variable and achievement score needs to be more closely interpreted. The possible values for this variable were very different—they were measured in hundreds of actions instead of single numbers—but it is difficult to imagine why this difference would affect the z-score results. It may be best to interpret the use of the backspace key by contrasting its effects with two other word processing tools: the delete key and the paste function.

Delete key. It is useful to contrast the effects of the delete key with those of the backspace key because they serve similar, and in some cases identical, functions: removing text from the manuscript. One important difference may be that the backspace

tool usually has a dedicated key on the keyboard of a laptop, while the delete tool does less often. There is no information available about the specific keyboards used in the 2011 NAEP writing assessment, but this is the standard layout for smaller keyboards including those used for laptops, though there are many exceptions. If the backspace function is easier to access than the delete function, this may account for the high usage of the backspace tool and the low use of the delete tool. This difference may have given the backspace tool an opportunity to be strongly correlated with achievement score that was denied the delete tool.

Paste function. The paste function serves as a contrast to the backspace tool, moving text rather than removing it. Text that has been "cut" can be pasted elsewhere, but text that has been removed with backspace or delete cannot. When the paste function has been used, it is reasonable to assume that the copy or cut function has been used and the student is revising rather than merely editing—attempting to improve the composition by moving a sizable section of text from one location to another. It is also then reasonable to assume that the size of the change made by the paste function is significantly larger than the change made by the backspace tool. This would suggest that the paste function is involved in the higher level revision of the text while the backspace tool is involved in the lower lever edits of the text. The theory of how word processing changes the writing process would predict that using the paste function would be more strongly related to achievement score than backspace. This study, however, found the exact opposite.

This contradiction may be an effect of the testing conditions. Other studies have looked at writing samples that students have completed over some time; students often have days to work on their composition. During the NAEP writing assessment, however,

students have only 30 minutes to respond to each writing prompt. Because of this, it may be more useful to think of the NAEP writing samples as first drafts rather than completed compositions. Thinking this way helps explain why the paste function was used so much less than the backspace tool. Students may not have had enough time to revise the text on the high level associated with the paste function, and focused more on those low level, mechanics-related edits associated with the backspace tool.

Combining this idea with the theory of Collier and Werier (1995) that good writers write well in any medium, it could be argued that the use of the backspace tool in this context represents good writers making effective revisions as they compose, not after they compose. This is supported by Goldberg, et al, (2003) finding that students who use word processors engage in editing and revision throughout the writing process. If this is the case, it would also explain why the paste function was found to be unrelated to achievement score. Good writers could be using the paste function to only occasionally move blocks of text, while poor writers could be moving text around more often without improving the finished product.

Thesaurus and spell check. The use of the thesaurus during the NAEP writing assessment was also strongly correlated with achievement score. This could readily be explained as the use of language tools being associated with better writing and word processors making language tools easier to use. However, spell check, probably the most well-known language tool incorporated into word processors, was negatively correlated with achievement score. Interpreting this apparent contradiction will contribute to understanding the findings of this study.

The theory of small edits. The literature generally agrees that word processors would improve student writing by making work easier to edit and revise (Dave & Russell, 2010). There is also much agreement that larger changes, often referred to as "revisions," will improve a writing sample more than smaller changes, often referred to as "edits" (Collier, 1983; Sudol, 1989). If both of these ideas were true, it would be logical to conclude that word processing tools that enable larger revisions would be better correlated with higher scores than those tools that enable smaller edits. Further, it would be predicted that tools that focused on changes of similar size would be similarly correlated to achievement score. This is not the finding of this study.

The above comparison of the use of the backspace key with the use of delete and paste functions illustrates how a variable's description of the relationship between word processing and higher achievement score does not reflect the size of the change encouraged by that tool. As is shown in Table 21, the qualities of the backspace key are different than those of the delete function, which are different than the paste function, but they do not have the effects predicted by previous theory. The previous theory would argue that the backspace key represents the word processor at its worst, encouraging only lower-level, small edits and is basically incapable of assisting in larger, higher level revisions—the backspace key removes one character at a time. Conversely, that same theory would argue that the paste function represents the word processor at its best because it discourages small edits and is focused on assisting the writer with larger, higher level revision. Thus it would be predicted that the use of the backspace key would not indicate that there is much of a relationship between word processing and higher scores, but that the paste function would.

Table 21
Comparison of Backspace, Delete, and Paste Functions

Backspace	Delete	Paste
Very strong relationship	Moderate relationship	No relationship
On keyboard	Not on keyboard	Not on keyboard
Low-level edits	Low-level or high-level edits	High-level edits
Remove text	Remove text	Move text
Makes small edits	Makes small or large edits	Makes large edits

This study finds the opposite of what the previous theory would predict: the use of the backspace key describes the relationship of word processing and higher scores to be very strong, while the use of the paste function indicates nothing at all.

A similar conflict appears in the comparison of the use of the thesaurus tool with the use of the spell check tool. Table 22 lays out their similarities and differences. Again, previous theory would predict that the use of the thesaurus and the use of spell check would have a similar correlation with higher scores because they function almost identically in terms of the size of the edit. This study, however, find these two tools to be almost polar opposites.

Table 22
Comparison of Thesaurus and Spall Check tools

Thesaurus	Spell Check
Strong relationship	Moderate or negative relationship
Language tool	Language tool
Less used	More used
Concerns word choice	Concerns mechanics
Makes small edits (one word)	Makes small edits (one word)

This study exposes a new relationship between small edits and quality of writing. This new factor is the purpose for making the change rather than simply the size of the edit. Both the thesaurus and the spell check tools help the author change a single word,

but the purposes for making such a change are very different. Spell check is focused exclusively on the mechanics of composition by making sure each word is spelled conventionally. The thesaurus is not concerned with mechanics at all, but with word choice. An author looks for a new word for the text because of the subtle meanings of the words chosen for the composition. The size of the change is still small, one word only, but the author is thinking about how his or her bigger ideas are being communicated to the reader. The change may appear small and subtle, but the impact on the composition can be great. Outside of studies involving word processing, the use of the thesaurus is often related to better writing. One author concludes that "the thesaurus is an essential tool and constant companion of professional writers, and perhaps it ought to be essential for writers at all stages of development" (Johnson, 2000, p 181). Interestingly, the use of the thesaurus is included in the Pennsylvania educational standards, though word processing is not mentioned (http://www.pdesas.org/standard/views#113|787|0|0).

This breaking of the connection between the size of a change made to the text and the value of a change made to the text is telling. Word processing now makes the text so malleable that large changes with a word processor are easier than small changes with a pencil, and small changes with a word processor are barely noticed. It is possible that students with higher cognitive ability are using the smaller editing tools to make small corrections as they compose what would otherwise be called the first draft. Misspelled words, for example, can be almost instantly corrected with the backspace key rather than the somewhat more laborious spell check function. Students without the ability to pay close attention to spelling while composing may rely on the spell check tool after the "first draft" is complete. In this scenario, the backspace key—a small edit tool—is

serving a similar function as the spell check. Conversely, writers with higher ability may have the extra capacity to think about word choice and use the thesaurus tool to improve their writing while using the spell check tool sparingly.

This implies that new paradigms are needed not just for the writing process as a system but for the idea of composition itself. The nature of composition can better reflect the thought process of the author rather than the processes imposed by old technology. Word choices can be careful and slow, or the author can hurriedly get ideas into the text with the understanding that word choice and other revision can come later without penalty. Even more game changing, the author can skip the text altogether and record a quick video with the understanding that the text itself can come later, if at all, without penalty. The word processor plays an important role in digital media by making text fluid, and education research must keep up with understanding how the new generation of students interacts with text.

Making changes and completing the paper. Both using a computer to make changes to a paper and using a computer to complete a paper started by hand are strongly related to achievement score. Both of these items are somewhat vaguely defined. "Finishing a paper" could include making changes to a paper, and "making changes" to a paper might be how a paper is completed. It remains useful, however, to contrast the latter's focus on the creation of text (completing a paper already started) with the former's focus on editing and revising (making changes) text already produced. Sudol (1998) claims that word processing encourages students to add text rather than cut text. Students "accumulate" text rather than revise previous text because word processors prevent students from internalizing the habits of good writers previously imposed by the

physical limitations of writing by hand. The results of this study contradict that claim, finding writing samples with higher scores are related to using word processors during both the production of text as well as the revising of text. This contradiction may further suggest that good writers can use editing tools (e.g., backspace) while composing text.

Availability of computers for writing instruction. It is reasonable to assume that the availability of computers for writing instruction is related to the social and economic environment in which the school is located. It is unlikely that a school would make computers available for other purposes but not for writing instruction. Social and economic status have been shown to be statistically significant predictors of the writing scores, as well as the overall language arts scores (Feldmann & Wener, 1984; O'Dwyer et al., 2005). This study contradicts this by finding no significant correlation between the availability of computers for writing instruction and achievement scores.

Both environmental factors and issues of method may explain this contradiction. It may be that teachers without access to as many computers as others were motivated enough to find ways to leverage what computers are available. Such motivation is demonstrated by the results of Adams and Russell (2004) where a large majority of educators believed using computers improves the results of writing. When there are fewer computers, teachers may be having students use the computers when the word processor can make the biggest difference. For example, teachers may have students start their work by hand and complete the writing on a computer, focusing the use of the computer and word processors on these parts of the writing process that this study finds are most significantly related to improving the quality of writing. Additional computers may only

increase the time students spend using word processors for generating text or other areas where word processors have less impact on the quality of the results.

Alternatively, this may be an effect of the wording of the item on the teacher questionnaire. Teachers were asked, "Which statement best describes computer availability for your writing instruction?" Table 23 lists the possible choices along with the percentage of students in the sample whose teacher selected each option.

Table 23
Availability of Computers Values with percentage of sample size

Value	Mean Score	% of Sample
There is no computer	150	15
All students share one	147	12
More than 3 students share one	148	19
2 to 3 students share one	146	13
Each student has one	153	41

The meaning of this item is called into question when it is found that 41% of the sample's teachers decided each of their students have their own computer for writing instruction. This cannot represent a dramatic upswing in one-to-one computing across the nation. It is more likely that teachers who consider each of their students to have individual computers are using computer labs when asking students to use a word processor. This variable may actually confound teachers who do have access to many computers with teachers who do not see the regular use of computers to be important. If so, this would explain the unexpected lack of differences in mean test score between these levels of use.

Gender and other control variables. Gender is a well known covariant in educational testing (Marsh & Yeung, 1998). Though shrinking in the past decade, there remains a gender gap in achievement tests generally (Good, Aronson, & Inzlicht, 2003).

There are several reason why this might happen, including "stereotype threat," the phenomenon where those in negatively stereotyped populations perform less well due to anxiety about their performance (Good et al., 2003; Steele & Aronson, 2004). Not surprisingly, this study confirms that gender significantly interferes with the measurement of the relationship between the use of word processors and achievement score, though it says nothing about the cause of this interference. What is difficult to interpret is the reason why gender was found to be a confounding variable while the other variables, also well known covariates, were found to interfere little or not at all when measuring the true relationship between word processors and students achievement.

Implications of findings.

For educational researchers. The research methods and the results of this study have implications for educational researches as wells as educators and policymakers. First, this study is a demonstration that an observational study can find ways to reduce the bias inherent in such studies. The use of subpopulations defined by control variables effectively de-aggregated the data into groups with some similar background covariates. Further, the use of NAEP data grounded the method in a dataset that was created by valid, unbiased instruments and is representative of the population. This is far from an experimental study, but helps to move the field forward in terms of general quality of research.

For educators and policymakers. There are two major implications of the results of this study important to educators and education policymakers. First, word processors should remain in the academic writing instruction and continue to receive attention alongside more recently introduced instructional technologies. Though in the

past it has been difficult to relate word processors to higher writing achievement, this study provides further evidence of a consistent and positive relationship. A goal of giving a computer to every student may be a good one, but much larger ratios can be leveraged to receive the positive effects of using word processors to write for academic work.

Second, the use of word processors for instruction should not be confused with word processors as a subject of instruction. The tools of word processors would also make useful subjects of instruction since there is evidence that making effective use of word processors is related to better written products. Even if learning how to use the word processor's thesaurus function, for example, improves a student's product, simply knowing how to make changes to the text does not imply the knowledge of where and why changes should be made. It would be worth thinking more about how a word processor's tools and functions can be leveraged to instill the habits of good writers.

Limitations

Limitations inherent in NAEP data. The data collected through the National Assessment of Educational Progress is valuable to researchers as well as policymakers. It must be remembered that the design choices that make NAEP data so valuable also make it difficult to apply to certain research questions. NAEP has been compared to the consumer price index or the national unemployment rate in that it changes over time and indicates the overall health of a system, but it would be inappropriate to use to investigate the reason why some specific part of the system works (Jones, 1996; Mislevy et al. 1992). The subjects of NAEP are really groups of students and no individual student completes the entire test. NAEP mitigates this by providing researchers with plausible values for performing secondary analyses. Conclusion regarding causation should still be avoided.

Limitations of public NAEP data. Beyond the limitations inherent in all NAEP data, the way this data is made available to the pubic imposes further limitations. The NAEP Data Explorer limits the researcher to including no more than three variables when creating a report, which further aggregates the data. This is important to protecting the privacy of the children participating in the test.

Limiting the method. The research questions asked by this study could have been answered with more straightforward statistical analyses if a single report could have been created with more than three variables. This aggregation of data in the Main NAEP database available to the public limited this study's ability to look more deeply into the details of the relationship between word processing and achievement scores. These limitations were mitigated—but not removed—by the use of data bundles and subpopulations. Subpopulations worked to de-aggregate the data. The use of data bundles to combine pairs of control variables multiplied the information available when making comparisons across the results.

Limiting the interpretation. This study was also limited by the lack of information about the word processor and laptops used by students during the 2011 NAEP writing test. Knowing how the keyboard was laid out would have added much to the ability to interpret the results concerning the student action logs. The confusion between "backspace" and "delete" is a good example of what could be avoided with better documentation available. These interpretations could be further debated if there was in fact no standard layout of keyboards or laptop computers used. The issue may be slightly more clouded if some computers, to continue the example, had a key labeled "delete" while others only had one labeled "backspace."

The student and teacher questionnaires also occasionally used language that could be misinterpreted. It would have been more useful to have items that clearly differentiated between composing and revising, rather than just "writing" and "changing." This may be unavoidable given the lack of agreed upon definitions and the need to have readers of different strengths understand the question. Still, it would be useful to continue to improve the questionnaires given to students and teachers.

The Writing Framework for the 2011 NAEP. NAEP data is normally comparable across years as well as across groups because the tests on different years are based on the same framework and reuse many of the same items based on that framework. This was not the case for the 2011 NAEP writing assessment. The National Assessment Governing Board chose to develop a new framework for this and future writing assessments in order to better reflect the technological environment in which students now write, as well as continuing development in the theory of writing instruction. This new framework is very useful for studies like this one investigating the role of technology in schools, but has effectively made all of the previous NAEP writing data unavailable to researchers. It would be very interesting to chart the results of the 2011 NAEP writing assessment alongside those of the 2007 and 2002 NAEP assessments, and compare these changes over time with changes in use of word processors in schools over that same time. This will be possible in 2016 when the next NAEP writing assessment is conducted.

At the same time, however, the NAEP writing assessment may already be limited by the new framework. It is easy to imagine this new framework being outdated before the next iteration of the NAEP writing test, but it could be argued that that the current

framework is already falling behind as the new generation of students embrace the new generation of tools for creating, sharing, and consuming not just text but writing that includes more than printed words. For example, most of the student action logs were based on the assumption of a keyboard and a mouse. Small editing was measured in terms of the backspace "key" and the delete "key." Will that be the way students interact with computers for composition and publication in five years? It may be more useful for these actions to be structured in terms of interactions with the text rather than interaction with the hardware. As this study suggests, it may be less useful to measure the size of the changes made and more important to measure the purposes behind the change. The word processor's ability to smoothly and easily change text makes the size of the change immaterial.

Future research directions.

One of the purposes of this study is to indicate areas where future research might be most fruitful. The results indicate that investigating tools similar to the backspace key and the thesaurus, and assignments such as using word processors to complete papers and make changes to papers will likely yield important information about the reasons why word processors are related to achievement in writing. Research should also focus on the role word processors play in the final stages of the writing process.

Beyond this, though, the results of this study bring up some important questions. First, answering questions about the impact of how much time students are given to complete a writing assignment may shed additional light on the differences found between word processing functions (e.g. backspace and spell check). Second, learning more about the role that gender plays in writing achievement may help explain why this

study found other control variables less interactive. Learning this may help measure the effects of those control variables more accurately and thereby untangle them from the real relationship between word processing and writing achievement. Third, this study suggests, more than previously thought, that there is a relationship of growing complexity between composition, editing, and revision. The new generation of students is using the new generation of technology to break the paradigms of "the writing process." Additional research is needed to understand how good writers interact with writing outside the process established by previous generations using previous technology.

Conclusion

This study was a secondary analysis of the 2011 NAEP writing test investigating the relationship between word processing and test scores. It advanced the field of educational research by using data and methods to overcome several of the limitations often found in research surrounding instructional technology. The statistical analyses of this data resulted in a table (Table 15) of z–scores and p-values that describe the relationship between general and specific uses of word processors and the total score on the NAEP writing assessment. Heuristic analysis of this table argued that there is a persistent and positive relationship between the use of word processors and writing achievement score. Specifically, the use of the backspace key, using word processors to make changes to a paper, using word processors to complete writing started by hand, and using the thesaurus function included in word processors are strongly related to achievement score. Though the limitations inherent in NAEP data prevent conclusion regarding causation, the results of this research suggest that word processors should become even more central to writing instruction, including how to effectively use the

tools provided and finding ways to have word processors support the habits of good writers.

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Appendix A

Calculating the Effect

A	B	C	D	E	F	G	H	I	J
Subgroups			Low-use group		High-use group		Estimate of Effect of Treatment in the population (controlled for gender and parent's education)		
Parent's Education	Gender	Percent of Sample	Average Scale Score	Standard Error of the Average Scale Score	Average Scale Score	Standard Error of the Average Scale Score	Estmation of the Subpopulation Effect	(Estimation of Subpopulation Effect) * (Percent of sample/100)	5.41
Did not finish high school	Male	3	123.10	1.33	124.55	2.33	1.45	0.04	
Did not finish high school	Female	4	127.22	1.26	131.17	1.70	3.96	0.16	
Graduated high school	Male	8	135.57	1.06	144.56	1.43	8.99	0.72	
Graduated high school	Female	8	146.57	0.91	156.75	1.10	10.19	0.81	
Some education after high school	Male	7	114.16	1.36	121.80	2.29	7.64	0.53	
Some education after high school	Female	8	140.71	1.14	143.06	2.17	2.35	0.19	
Graduated college	Male	27	146.60	1.02	150.84	1.56	4.25	1.15	
Graduated college	Female	26	158.98	1.21	163.28	1.22	4.30	1.12	
Unknown	Male	5	166.60	0.82	174.37	0.99	7.77	0.39	
Unknown	Female	4	133.05	1.52	140.48	1.91	7.44	0.30	
		Copied from Report	Copied from Report	Copied from Report	Copied from Report	Copied from Report	F-D	H * (C/100)	Sum(I:I)

Appendix B

Calculating the Error

A	B	C	D	E	F	G	H	I	J	K	L
Subgroups			Low-use group		High-use group		Variance of the Estimate of Effect of Treatment in the population (controlled for gender and parent's education)				
Parent's Education	Gender	Percent of Sample	Average Scale Score	Standard Error of the Average Scale Score	Average Scale Score	Standard Error of the Average Scale Score	Variance of Average Scale Score (Never-sometimes)	Variance of Average Scale Score (Usually-Always)	Variance of Difference of Average Scale Scores	(Variance of Differences of Average Scale Scores) * ((Percent of Sample/100) squared)	0.59
Did not finish high school	Male	3	123.10	1.33	124.55	2.33	1.78	5.42	7.20	0.01	
Did not finish high school	Female	4	127.22	1.26	131.17	1.70	1.59	2.90	4.49	0.01	
Graduated high school	Male	8	135.57	1.06	144.56	1.43	1.13	2.05	3.18	0.02	
Graduated high school	Female	8	146.57	0.91	156.75	1.10	0.83	1.22	2.05	0.01	
Some education after high school	Male	7	114.16	1.36	121.80	2.29	1.85	5.22	7.07	0.03	
Some education after high school	Female	8	140.71	1.14	143.06	2.17	1.29	4.69	5.99	0.04	
Graduated college	Male	27	146.60	1.02	150.84	1.56	1.04	2.44	3.48	0.25	
Graduated college	Female	26	158.98	1.21	163.28	1.22	1.48	1.48	2.96	0.20	
Unknown	Male	5	166.60	0.82	174.37	0.99	0.67	0.99	1.66	0.00	
Unknown	Female	4	133.05	1.52	140.48	1.91	2.32	3.66	5.97	0.01	
		Copied from Report	Copied from Report	Copied from Report	Copied from Report	Copied from Report	E * E	G * G	H + I - zero	J * ((C/100)*(C/100))	SUM(K:K)

Appendix C.1

Backspace Key Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer: http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the backspace key (collapsed) [WC30024], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	how use (collapsed) Average scale score	how use (collapsed) Standard error	high use (collapsed) Average scale score	high use (collapsed) Standard error
National	2011	Male	Eligible	118	(0.8)	140	(0.9)
			Not eligible	141	(0.9)	167	(1.0)
			Information not available	143	(2.6)	167	(3.0)
		Female	Eligible	131	(0.6)	155	(0.8)
			Not eligible	156	(1.0)	179	(0.9)
			Information not available	154	(3.0)	179	(2.5)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR			VARIANCE OF EFFECT		
Gender	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	23.66	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	*p*	*test statistic*
Male	Eligible	21	118.36	0.76	139.98	0.92	21.63	4.54		0.57	0.85	1.43	0.30	0.000	15.32
	Not eligible	27	141.27	0.89	166.56	0.98	25.29	6.83		0.79	0.96	1.75	0.47		
	Information not available	3	142.86	2.64	167.06	3.00	24.20	0.73		6.96	9.02	15.98	0.48		
Female	Eligible	21	131.28	0.57	154.69	0.83	23.41	4.92		0.33	0.68	1.01	0.21		
	Not eligible	26	156.33	1.02	179.08	0.88	22.75	5.91		1.04	0.77	1.81	0.47		
	Information not available	3	154.25	2.98	178.58	2.46	24.33	0.73		8.89	6.05	14.94	0.45		

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the backspace key (collapsed) [WC30024], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	117	(1.2)	137	(2.3)
			Graduated high school	122	(1.1)	144	(1.7)
			Some education after high school	131	(1.0)	153	(1.4)
			Graduated college	141	(0.9)	166	(1.0)
			Unknown	109	(1.4)	132	(2.1)
		Female	Did not finish high school	130	(1.4)	150	(1.6)
			Graduated high school	136	(1.1)	157	(1.1)
			Some education after high school	145	(1.1)	170	(1.0)
			Graduated college	155	(1.0)	179	(0.8)
			Unknown	122	(1.6)	147	(1.6)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	23.78	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	2.70	**14.48**	**0.000**
Male	Did not finish high school	3	117.50	1.21	137.10	2.30	19.60	0.59		1.45	5.31	6.77	0.20			
	Graduated high school	8	121.52	1.10	143.69	1.66	22.17	1.77		1.22	2.74	3.96	0.32			
	Some education after high school	7	130.86	1.01	153.12	1.37	22.26	1.56		1.01	1.88	2.89	0.20			
	Graduated college	27	140.80	0.88	166.38	0.98	25.57	6.90		0.77	0.96	1.73	0.47			
	Unknown	5	108.61	1.38	131.61	2.06	23.00	1.15		1.91	4.25	6.15	0.31			
Female	Did not finish high school	4	129.90	1.45	150.17	1.64	20.28	0.81		2.10	2.70	4.80	0.19			
	Graduated high school	8	135.50	1.08	157.44	1.12	21.94	1.76		1.17	1.25	2.42	0.19			
	Some education after high school	8	145.25	1.06	170.17	1.02	24.91	1.99		1.13	1.04	2.17	0.17			
	Graduated college	26	154.54	1.03	178.53	0.80	23.99	6.24		1.06	0.64	1.71	0.44			
	Unknown	4	121.72	1.56	146.93	1.58	25.20	1.01		2.43	2.49	4.92	0.20			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the backspace key (collapsed) [WC30024], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	125	(1.3)	152	(1.6)
			Suburb	135	(1.2)	162	(1.5)
			Town	129	(1.8)	154	(2.0)
			Rural	132	(1.3)	157	(1.9)
		Female	City	137	(1.3)	164	(1.2)
			Suburb	148	(1.4)	175	(1.2)
			Town	144	(1.3)	168	(1.5)
			Rural	146	(1.5)	169	(1.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	26.32	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.16	**12.91**	**0.000**
Male	City	14	125.13	1.28	152.36	1.62	27.23	3.81		1.63	2.64	4.27	0.60			
	Suburb	19	134.99	1.20	161.89	1.53	26.90	5.11		1.45	2.35	3.80	0.72			
	Town	6	129.28	1.85	154.35	2.04	25.07	1.50		3.41	4.17	7.58	0.45			
	Rural	12	132.04	1.31	156.93	1.87	24.89	2.99		1.73	3.49	5.22	0.63			
Female	City	14	137.19	1.27	164.35	1.17	27.15	3.80		1.60	1.36	2.97	0.42			
	Suburb	19	147.64	1.40	174.56	1.20	26.92	5.11		1.96	1.44	3.39	0.64			
	Town	6	144.04	1.34	167.72	1.47	23.67	1.42		1.80	2.16	3.96	0.24			
	Rural	11	145.79	1.47	169.14	1.42	23.35	2.57		2.16	2.01	4.17	0.46			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the backspace key (collapsed) [WC30024], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	139	(0.9)	167	(1.0)
			Black	116	(1.3)	139	(1.9)
			Hispanic	121	(0.9)	144	(1.1)
			Asian	141	(3.4)	167	(2.2)
			American Indian/Alaska Native	119	(4.4)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	132	(1.4)	158	(2.4)
		Female	White	154	(1.0)	177	(0.9)
			Black	128	(1.3)	153	(1.7)
			Hispanic	134	(1.0)	157	(0.9)
			Asian	151	(3.9)	181	(1.6)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	148	(1.6)	172	(1.4)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	24.00	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.08	13.67	0.000
Male	White	26	139.48	0.91	166.66	1.01	27.18	7.07		0.82	1.01	1.83	0.48			
	Black	6	116.37	1.30	138.92	1.92	22.55	1.35		1.68	3.67	5.35	0.32			
	Hispanic	13	120.87	0.90	143.57	1.07	22.70	2.95		0.81	1.14	1.95	0.25			
	Asian	2	141.16	3.40	166.88	2.24	25.72	0.51		11.53	5.02	16.55	0.33			
	American Indian/Alaska Native	0	119.35	4.39	‡	†				19.27						
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	3	131.72	1.44	157.63	2.40	25.90	0.78		2.06	5.76	7.82	0.23			
Female	White	25	154.19	1.03	177.24	0.88	23.06	5.76		1.07	0.77	1.84	0.46			
	Black	6	127.81	1.33	152.60	1.72	24.79	1.49		1.77	2.95	4.72	0.28			
	Hispanic	12	134.07	1.02	157.05	0.91	22.98	2.76		1.03	0.83	1.86	0.22			
	Asian	2	151.01	3.93	180.64	1.61	29.64	0.59		15.48	2.59	18.07	0.36			
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	3	147.64	1.63	172.27	1.39	24.63	0.74		2.65	1.92	4.57	0.14			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the backspace key (collapsed) [WC30024], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	120	(1.0)	145	(1.1)
			Suburb	125	(0.9)	151	(1.2)
			Town	125	(2.0)	152	(1.8)
			Rural	126	(1.3)	153	(1.8)
		Not eligible	City	146	(1.4)	172	(1.2)
			Suburb	149	(1.4)	178	(1.3)
			Town	142	(1.9)	170	(1.2)
			Rural	145	(1.2)	172	(1.4)
		Information not available	City	146	(4.2)	175	(3.7)
			Suburb	149	(4.1)	175	(4.3)
			Town	‡	†	166	(3.7)
			Rural	144	(3.2)	171	(6.1)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	26.53	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.12	**11.72**	**0.000**
Eligible	City	15	119.88	0.97	144.63	1.05	24.76	3.71		0.95	1.11	2.06	0.31			
	Suburb	13	125.50	0.92	151.14	1.16	25.64	3.33		0.84	1.35	2.20	0.29			
	Town	5	124.77	1.96	152.04	1.84	27.26	1.36		3.85	3.38	7.24	0.36			
	Rural	9	125.82	1.30	152.74	1.84	26.91	2.42		1.70	3.40	5.10	0.46			
Not eligible	City	10	145.62	1.38	171.98	1.19	26.36	2.64		1.91	1.42	3.33	0.33			
	Suburb	23	149.38	1.38	177.74	1.30	28.36	6.52		1.89	1.68	3.58	0.82			
	Town	6	141.80	1.89	170.07	1.17	28.28	1.70		3.58	1.37	4.95	0.30			
	Rural	13	145.03	1.24	171.62	1.40	26.59	3.46		1.55	1.96	3.50	0.46			
Information not available	City	2	146.13	4.22	175.21	3.73	29.08	0.58		17.78	13.93	31.70	0.63			
	Suburb	2	148.92	4.06	175.29	4.28	26.37	0.53		16.51	18.36	34.87	0.70			
	Town	1	‡	†	166.16	3.70					13.66					
	Rural	1	143.68	3.16	171.16	6.06	27.48	0.27		9.98	36.75	46.73	0.47			

National Center for Education Statistics (NCES)
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Average scale scores for writing, grade 8 by how often students used the backspace key (collapsed) [WC30024], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	121	(1.2)	144	(1.4)
			Graduated high school	122	(0.9)	145	(1.1)
			Some education after high school	131	(1.1)	157	(1.2)
			Graduated college	129	(0.9)	156	(0.9)
			Unknown	110	(1.2)	135	(1.7)
		Not eligible	Did not finish high school	133	(2.4)	154	(2.5)
			Graduated high school	136	(1.4)	162	(1.4)
			Some education after high school	142	(1.1)	172	(1.4)
			Graduated college	152	(1.1)	178	(0.9)
			Unknown	123	(2.3)	152	(2.0)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	‡	†	‡	†
			Some education after high school	‡	†	163	(4.5)
			Graduated college	152	(2.2)	177	(2.3)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	25.66	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	2.97	**14.90**	**0.000**
Eligible	Did not finish high school	6	120.97	1.20	144.50	1.38	23.53	1.41		1.45	1.91	3.36	0.20			
	Graduated high school	10	121.88	0.91	145.11	1.06	23.24	2.32		0.82	1.12	1.95	0.19			
	Some education after high school	8	131.26	1.12	156.50	1.20	25.24	2.02		1.26	1.43	2.69	0.22			
	Graduated college	13	129.13	0.93	156.49	0.91	27.36	3.56		0.87	0.83	1.70	0.22			
	Unknown	6	109.79	1.23	135.28	1.69	25.50	1.53		1.52	2.86	4.38	0.26			
Not eligible	Did not finish high school	1	132.77	2.39	154.42	2.49	21.65	0.22		5.70	6.19	11.89	0.12			
	Graduated high school	6	135.99	1.41	162.40	1.43	26.40	1.58		1.98	2.04	4.02	0.24			
	Some education after high school	7	142.12	1.13	172.02	1.45	29.89	2.09		1.28	2.10	3.38	0.24			
	Graduated college	36	152.08	1.05	178.06	0.87	25.98	9.35		1.10	0.76	1.86	0.67			
	Unknown	2	123.41	2.29	151.79	2.05	28.38	0.57		5.27	4.19	9.45	0.19			
Information not available	Did not finish high school	0	‡	†	‡	†										
	Graduated high school	0	‡	†	‡	†										
	Some education after high school	1	‡	†	162.94	4.49					20.16					
	Graduated college	4	152.05	2.22	177.17	2.34	25.13	1.01		4.94	5.49	10.43	0.42			
	Unknown	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
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This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the backspace key (collapsed) [WC30024], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	131	(1.0)	158	(1.1)
			Black	116	(1.1)	141	(1.7)
			Hispanic	121	(0.8)	144	(0.9)
			Asian	124	(3.4)	161	(2.8)
			American Indian/Alaska Native	114	(4.2)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	131	(1.6)	156	(2.1)
		Not eligible	White	150	(1.0)	177	(0.9)
			Black	133	(1.6)	160	(2.2)
			Hispanic	138	(1.2)	164	(1.0)
			Asian	155	(3.9)	180	(1.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	146	(2.0)	174	(1.6)
		Information not available	White	152	(2.3)	178	(2.5)
			Black	‡	†	‡	†
			Hispanic	137	(3.8)	167	(3.3)
			Asian	‡	†	179	(5.4)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	25.32	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.48	13.56	0.000
Eligible	White	13	130.93	1.03	158.25	1.13	27.32	3.55		1.06	1.27	2.33	0.30			
	Black	8	116.15	1.11	141.13	1.66	24.98	2.00		1.23	2.77	4.00	0.32			
	Hispanic	16	120.66	0.79	144.29	0.86	23.63	3.78		0.63	0.74	1.36	0.22			
	Asian	1	124.37	3.39	161.30	2.76	36.93	0.37		11.49	7.60	19.09	0.19			
	American Indian/Alaska Native	0	113.92	4.21	‡	†				17.75						
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	3	131.11	1.60	156.49	2.09	25.38	0.76		2.56	4.36	6.92	0.21			
Not eligible	White	35	149.83	0.97	177.28	0.95	27.45	9.61		0.95	0.89	1.84	0.64			
	Black	3	133.34	1.62	160.03	2.15	26.69	0.80		2.63	4.63	7.26	0.22			
	Hispanic	8	138.10	1.23	163.62	1.03	25.52	2.04		1.51	1.07	2.58	0.21			
	Asian	2	155.25	3.91	180.50	1.89	25.25	0.50		15.27	3.59	18.86	0.38			
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	3	146.08	2.00	173.62	1.64	27.54	0.83		4.01	2.68	6.69	0.20			
Information not available	White	3	151.77	2.31	177.58	2.49	25.81	0.77		5.33	6.18	11.51	0.35			
	Black	0	‡	†	‡	†										
	Hispanic	1	136.94	3.77	166.79	3.32	29.86	0.30		14.24	11.05	25.29	0.25			
	Asian	0	‡	†	179.09	5.40					29.21					
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the backspace key (collapsed) [WC30024], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	119	(1.5)	143	(2.1)
			Graduated high school	122	(1.4)	146	(1.5)
			Some education after high school	133	(1.4)	159	(1.8)
			Graduated college	141	(1.3)	171	(1.3)
			Unknown	110	(1.8)	135	(2.2)
		Suburb	Did not finish high school	125	(1.7)	147	(2.2)
			Graduated high school	130	(1.4)	154	(1.6)
			Some education after high school	136	(1.6)	165	(1.9)
			Graduated college	150	(1.3)	178	(1.3)
			Unknown	116	(2.2)	146	(2.0)
		Town	Did not finish high school	124	(4.2)	149	(5.1)
			Graduated high school	124	(2.2)	154	(2.2)
			Some education after high school	142	(2.1)	169	(2.1)
			Graduated college	143	(2.1)	169	(1.3)
			Unknown	112	(3.3)	138	(4.2)
		Rural	Did not finish high school	126	(3.4)	150	(2.2)
			Graduated high school	129	(1.7)	156	(2.4)
			Some education after high school	137	(1.8)	165	(2.2)
			Graduated college	145	(1.5)	171	(1.5)
			Unknown	116	(2.5)	143	(2.9)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	27.12	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.13	10.95	0.000
City	Did not finish high school	3	119.46	1.50	142.87	2.12	23.41	0.70		2.25	4.51	6.76	0.20			
	Graduated high school	4	122.44	1.36	146.11	1.53	23.66	0.95		1.86	2.33	4.19	0.17			
	Some education after high school	4	132.68	1.35	159.32	1.77	26.64	1.07		1.83	3.13	4.96	0.20			
	Graduated college	13	140.76	1.33	170.58	1.27	29.82	3.88		1.76	1.60	3.36	0.44			
	Unknown	3	110.24	1.80	134.69	2.23	24.45	0.73		3.22	4.95	8.18	0.25			
Suburb	Did not finish high school	2	125.12	1.71	147.40	2.22	22.27	0.45		2.92	4.92	7.84	0.16			
	Graduated high school	5	129.80	1.39	154.26	1.58	24.47	1.22		1.94	2.48	4.42	0.22			
	Some education after high school	6	136.31	1.56	165.34	1.87	29.03	1.74		2.44	3.48	5.92	0.36			
	Graduated college	22	149.99	1.34	178.14	1.28	28.15	6.19		1.80	1.63	3.43	0.75			
	Unknown	3	115.61	2.21	146.43	2.04	30.81	0.92		4.88	4.15	9.03	0.27			
Town	Did not finish high school	1	123.93	4.23	148.52	5.13	24.58	0.25		17.92	26.31	44.23	0.44			
	Graduated high school	2	124.10	2.21	153.73	2.22	29.63	0.59		4.87	4.94	9.81	0.20			
	Some education after high school	2	142.35	2.08	168.73	2.14	26.38	0.53		4.34	4.60	8.94	0.18			
	Graduated college	6	142.66	2.07	168.63	1.28	25.97	1.56		4.30	1.63	5.93	0.36			
	Unknown	1	112.19	3.35	138.04	4.16	25.85	0.26		11.22	17.28	28.50	0.28			
Rural	Did not finish high school	1	125.81	3.43	149.72	2.19	23.91	0.24		11.76	4.81	16.57	0.17			
	Graduated high school	4	128.87	1.73	156.21	2.36	27.34	1.09		2.99	5.55	8.53	0.34			
	Some education after high school	4	137.37	1.77	164.93	2.16	27.56	1.10		3.14	4.66	7.80	0.31			
	Graduated college	12	145.01	1.49	170.90	1.54	25.89	3.11		2.23	2.36	4.59	0.55			
	Unknown	2	116.30	2.45	143.21	2.92	26.90	0.54		6.02	8.54	14.56	0.29			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the backspace key (collapsed) [WC30024], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	145	(1.6)	174	(1.6)
			Black	118	(1.6)	143	(2.3)
			Hispanic	124	(1.4)	148	(1.2)
			Asian	138	(4.2)	170	(2.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	135	(2.2)	164	(2.7)
		Suburb	White	149	(1.4)	178	(1.4)
			Black	125	(1.6)	150	(2.1)
			Hispanic	128	(1.2)	154	(1.4)
			Asian	153	(4.2)	182	(2.2)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	142	(2.3)	169	(2.8)
		Town	White	140	(1.8)	168	(1.2)
			Black	119	(4.7)	‡	†
			Hispanic	124	(2.0)	153	(2.4)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	137	(3.0)	‡	†
		Rural	White	141	(1.3)	169	(1.4)
			Black	121	(3.3)	149	(3.6)
			Hispanic	128	(1.8)	155	(1.9)
			Asian	‡	†	181	(3.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	136	(2.5)	166	(3.2)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	26.94	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.01	10.99	0.000
City	White	9	145.50	1.57	174.16	1.60	28.66	2.58		2.46	2.58	5.04	0.45			
	Black	5	118.50	1.64	143.40	2.26	24.91	1.25		2.68	5.12	7.80	0.39			
	Hispanic	10	123.64	1.41	148.30	1.19	24.66	2.47		1.98	1.42	3.40	0.34			
	Asian	2	138.14	4.18	169.69	2.15	31.55	0.63		17.44	4.60	22.04	0.44			
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	2	134.85	2.24	164.34	2.67	29.49	0.59		5.00	7.12	12.12	0.24			
Suburb	White	20	149.26	1.36	178.06	1.44	28.80	5.76		1.86	2.07	3.93	0.79			
	Black	4	124.59	1.60	150.30	2.09	25.71	1.03		2.55	4.38	6.92	0.28			
	Hispanic	10	128.38	1.16	154.41	1.38	26.03	2.60		1.34	1.89	3.24	0.32			
	Asian	2	152.58	4.15	181.72	2.18	29.14	0.58		17.24	4.75	21.99	0.44			
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	3	142.42	2.28	168.85	2.78	26.43	0.79		5.20	7.74	12.94	0.39			
Town	White	8	139.70	1.79	167.97	1.17	28.27	2.26		3.20	1.37	4.57	0.37			
	Black	1	118.77	4.70	‡	†				22.08						
	Hispanic	2	123.57	1.99	152.75	2.37	29.19	0.58		3.96	5.61	9.57	0.19			
	Asian	0	‡	†	‡	†										
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	1	137.46	3.01	‡	†				9.05						
Rural	White	15	141.25	1.27	168.93	1.35	27.69	4.15		1.61	1.84	3.44	0.52			
	Black	2	121.43	3.32	148.82	3.64	27.38	0.55		11.00	13.25	24.25	0.48			
	Hispanic	3	127.70	1.77	154.84	1.88	27.13	0.81		3.15	3.52	6.67	0.20			
	Asian	0	‡	†	180.78	3.89					15.13					
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	1	136.36	2.50	166.26	3.24	29.89	0.30		6.24	10.47	16.71	0.17			

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the backspace key (collapsed) [WC30024], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year ntal education level, from 2 questions		Race/ethnicity using 2011 guidelines, student-reported	erage scale score	Standard error	erage scale score	Standard error
National	2011	Did not finish high school	White	128	(2.5)	154	(2.4)
			Black	110	(2.7)	‡	†
			Hispanic	122	(1.2)	144	(1.5)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	133	(1.2)	161	(1.3)
			Black	115	(1.8)	137	(2.7)
			Hispanic	123	(1.5)	146	(1.5)
			Asian	‡	†	162	(4.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	134	(3.1)	151	(4.3)
		Some education after high school	White	142	(1.2)	171	(1.2)
			Black	126	(1.3)	152	(2.8)
			Hispanic	133	(1.7)	157	(1.8)
			Asian	‡	†	177	(4.6)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	137	(2.6)	164	(3.0)
		Graduated college	White	152	(1.1)	178	(0.9)
			Black	128	(1.4)	153	(1.6)
			Hispanic	136	(1.3)	164	(1.0)
			Asian	155	(3.5)	179	(1.7)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	143	(1.7)	173	(1.7)
		Unknown	White	120	(2.0)	150	(2.7)
			Black	104	(2.7)	133	(4.3)
			Hispanic	110	(1.3)	133	(1.9)
			Asian	‡	†	157	(4.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	117	(4.1)	‡	†

† Not applicable.

‡ Reporting standards not met.

NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			**Control Group**		**Treatment Group**		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	24.98	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.67	11.55	0.000
Did not finish high school	White	2	128.48	2.49	153.92	2.38	25.44	0.51		6.22	5.66	11.88	0.24			
	Black	1	110.12	2.67	‡	†				7.15						
	Hispanic	4	122.08	1.17	143.55	1.51	21.47	0.86		1.38	2.29	3.67	0.15			
	Asian	0	‡	†	‡	†										
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										
Graduated high school	White	7	133.44	1.20	161.16	1.32	27.72	1.94		1.43	1.73	3.16	0.22			
	Black	2	114.61	1.80	137.41	2.66	22.80	0.46		3.24	7.10	10.34	0.21			
	Hispanic	5	123.38	1.54	145.82	1.45	22.44	1.12		2.36	2.11	4.47	0.22			
	Asian	0	‡	†	162.21	4.86					23.62					
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	1	133.73	3.14	151.23	4.30	17.50	0.18		9.86	18.51	28.37	0.28			
Some education after high school	White	7	142.44	1.19	170.78	1.23	28.34	1.98		1.41	1.51	2.91	0.20			
	Black	2	125.69	1.34	151.66	2.83	25.96	0.52		1.79	7.98	9.77	0.20			
	Hispanic	4	132.86	1.65	157.47	1.76	24.61	0.98		2.73	3.11	5.84	0.23			
	Asian	0	‡	†	177.22	4.64					21.53					
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	1	136.94	2.62	163.61	3.01	26.67	0.27		6.86	9.08	15.94	0.16			
Graduated college	White	33	152.06	1.06	178.21	0.89	26.16	8.63		1.12	0.80	1.92	0.63			
	Black	5	127.65	1.45	153.08	1.59	25.43	1.27		2.09	2.53	4.62	0.23			
	Hispanic	8	136.40	1.29	164.22	1.03	27.82	2.23		1.66	1.07	2.73	0.22			
	Asian	3	154.95	3.54	179.27	1.65	24.32	0.73		12.51	2.72	15.23	0.46			
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	4	143.34	1.71	172.87	1.65	29.53	1.18		2.94	2.72	5.66	0.23			
Unknown	White	3	119.52	1.96	150.18	2.65	30.65	0.92		3.84	7.04	10.87	0.33			
	Black	1	104.05	2.74	132.75	4.34	28.70	0.29		7.52	18.82	26.34	0.26			
	Hispanic	4	110.20	1.29	133.09	1.87	22.89	0.92		1.66	3.49	5.16	0.21			
	Asian	0	‡	†	157.36	4.50					20.21					
	American Indian/Alaska Native	0	‡	†	‡	†										
	Native Hawaiian/Other Pacific Islander	0	‡	†	‡	†										
	Two or more races	0	117.36	4.14	‡	†				17.16						

Appendix C.2

Delete Key Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer: http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the delete key [WC30025], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	0 times		1 time or more	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	124	(0.7)	133	(2.7)
			Not eligible	150	(0.9)	161	(1.5)
			Information not available	154	(2.7)	158	(4.8)
		Female	Eligible	143	(0.6)	152	(1.9)
			Not eligible	170	(0.8)	179	(1.5)
			Information not available	170	(2.8)	177	(5.6)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.88	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.49	3.79	0.000
Male	Eligible	21	124.29	0.67	132.52	2.66	8.23	1.73		0.45	7.08	7.52	1.58			
	Not eligible	27	149.88	0.88	160.61	1.54	10.74	2.90		0.77	2.36	3.14	0.85			
	Information not av	3	153.52	2.68	157.85	4.81	4.33	0.13		7.19	23.12	30.32	0.91			
Female	Eligible	21	143.40	0.64	152.08	1.87	8.67	1.82		0.41	3.48	3.90	0.82			
	Not eligible	26	170.37	0.80	178.51	1.45	8.14	2.12		0.64	2.11	2.76	0.72			
	Information not av	3	170.23	2.77	176.53	3.59	6.30	0.19		7.67	12.87	20.54	0.62			

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Average scale scores for writing, grade 8 by how often students used the delete key [WC30025], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				0 times		1 time or more	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	133	(1.3)	149	(2.4)
			Suburb	144	(1.2)	158	(2.0)
			Town	137	(1.9)	146	(3.5)
			Rural	139	(1.4)	151	(2.7)
		Female	City	151	(1.2)	168	(2.6)
			Suburb	164	(1.4)	174	(1.7)
			Town	158	(1.5)	165	(2.2)
			Rural	159	(1.4)	171	(2.8)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	13.10	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.75	**4.71**	**0.000**
Male	City	14	133.44	1.32	149.15	2.41	15.71	2.20		1.74	5.79	7.53	1.05			
	Suburb	19	143.67	1.24	158.20	2.02	14.53	2.76		1.53	4.08	5.61	1.07			
	Town	6	137.35	1.86	145.99	3.49	8.64	0.52		3.45	12.18	15.63	0.94			
	Rural	12	138.68	1.44	151.26	2.67	12.58	1.51		2.08	7.14	9.23	1.11			
Female	City	14	151.15	1.19	167.99	2.60	16.83	2.36		1.40	6.74	8.15	1.14			
	Suburb	19	163.59	1.39	174.39	1.70	10.80	2.05		1.92	2.88	4.80	0.91			
	Town	6	158.34	1.47	165.32	2.25	6.98	0.42		2.17	5.04	7.21	0.43			
	Rural	11	158.88	1.41	170.59	2.83	11.71	1.29		1.99	8.02	10.01	1.10			

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Average scale scores for writing, grade 8 by how often students used the delete key [WC30025], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				0 times		1 time or more	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	123	(1.1)	‡	†
			Graduated high school	127	(1.1)	138	(3.6)
			Some education after high school	138	(1.0)	146	(2.9)
			Graduated college	150	(0.9)	161	(1.5)
			Unknown	115	(1.2)	122	(5.6)
		Female	Did not finish high school	141	(1.2)	‡	†
			Graduated high school	147	(0.9)	155	(2.6)
			Some education after high school	160	(1.0)	167	(2.7)
			Graduated college	169	(0.8)	178	(1.5)
			Unknown	134	(1.2)	144	(4.7)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.71	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.21	**3.24**	**0.001**
Male	Did not finish high	3	122.56	1.09	‡	†				1.19						
	Graduated high sc	8	127.48	1.09	138.44	3.63	10.97	0.88		1.19	13.18	14.36	1.15			
	Some education a	7	137.78	1.02	145.78	2.93	8.00	0.56		1.04	8.56	9.60	0.67			
	Graduated college	27	149.68	0.85	160.70	1.49	11.01	2.97		0.73	2.21	2.94	0.79			
	Unknown	5	115.06	1.17	121.71	5.59	6.65	0.33		1.37	31.28	32.65	1.63			
Female	Did not finish high	4	140.56	1.23	‡	†				1.50						
	Graduated high sc	8	147.15	0.94	155.35	2.60	8.20	0.66		0.89	6.76	7.65	0.61			
	Some education a	8	159.84	0.99	166.94	2.75	7.09	0.57		0.98	7.55	8.54	0.68			
	Graduated college	26	169.18	0.79	178.26	1.47	9.09	2.36		0.62	2.17	2.79	0.73			
	Unknown	4	134.17	1.15	143.74	4.71	9.57	0.38		1.33	22.20	23.53	0.94			

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Average scale scores for writing, grade 8 by how often students used the delete key [WC30025], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				0 times		1 time or more	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	148	(0.9)	158	(1.7)
			Black	122	(1.3)	135	(4.1)
			Hispanic	128	(0.8)	141	(2.3)
			Asian	155	(2.5)	173	(4.0)
			American Indian/Alaska Native	125	(3.9)	‡	†
			Native Hawaiian/Other Pacific Islander	123	(5.1)	‡	†
			Two or more races	141	(1.6)	150	(4.9)
		Female	White	168	(0.8)	176	(1.6)
			Black	139	(1.4)	152	(3.8)
			Hispanic	146	(0.8)	160	(2.4)
			Asian	174	(2.1)	182	(4.4)
			American Indian/Alaska Native	142	(4.3)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	161	(1.3)	170	(3.4)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	10.61	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.53	3.87	0.000
Male	White	26	147.99	0.94	158.21	1.69	10.22	2.66		0.87	2.85	3.72	0.97			
	Black	6	121.89	1.26	135.46	4.09	13.57	0.81		1.60	16.77	18.36	1.10			
	Hispanic	13	127.57	0.84	140.79	2.26	13.22	1.72		0.70	5.12	5.82	0.76			
	Asian	2	155.24	2.49	172.57	4.02	17.33	0.35		6.22	16.14	22.36	0.45			
	American Indian/A	0	124.67	3.91	‡	†				15.29						
	Native Hawaiian/O	0	123.06	5.11	‡	†				26.11						
	Two or more races	3	140.56	1.60	149.73	4.90	9.17	0.28		2.55	24.06	26.61	0.80			
Female	White	25	168.23	0.78	176.22	1.63	7.98	2.00		0.61	2.66	3.26	0.82			
	Black	6	138.76	1.44	151.81	3.84	13.06	0.78		2.09	14.74	16.82	1.01			
	Hispanic	12	146.32	0.79	159.71	2.37	13.40	1.61		0.62	5.63	6.25	0.75			
	Asian	2	174.08	2.12	181.56	4.41	7.48	0.15		4.49	19.46	23.96	0.48			
	American Indian/A	0	142.15	4.33	‡	†				18.71						
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	161.01	1.34	169.76	3.40	8.74	0.26		1.81	11.54	13.35	0.40			

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Average scale scores for writing, grade 8 by how often students used the delete key [WC30025], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				0 times		1 time or more	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	129	(1.0)	138	(3.3)
			Suburb	136	(1.0)	143	(2.4)
			Town	137	(1.5)	143	(4.1)
			Rural	136	(1.5)	148	(3.4)
		Not eligible	City	158	(1.4)	169	(1.9)
			Suburb	164	(1.4)	173	(1.6)
			Town	156	(1.4)	162	(2.8)
			Rural	157	(1.3)	166	(2.3)
		Information not available	City	163	(4.4)	168	(5.9)
			Suburb	163	(4.8)	171	(4.8)
			Town	156	(4.4)	‡	†
			Rural	157	(3.7)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.58	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	9.91	**2.72**	**0.006**
Eligible	City	15	129.19	0.97	138.24	3.32	9.05	1.36		0.93	10.99	11.93	1.79			
	Suburb	13	136.10	0.98	142.70	2.41	6.60	0.86		0.97	5.81	6.78	0.88			
	Town	5	136.82	1.49	143.27	4.13	6.45	0.32		2.23	17.10	19.33	0.97			
	Rural	9	136.36	1.49	148.24	3.35	11.87	1.07		2.23	11.25	13.48	1.21			
Not eligibl	City	10	158.16	1.37	169.33	1.89	11.17	1.12		1.88	3.58	5.46	0.55			
	Suburb	23	163.78	1.39	172.79	1.63	9.01	2.07		1.93	2.64	4.57	1.05			
	Town	6	155.58	1.42	161.98	2.79	6.40	0.38		2.00	7.79	9.80	0.59			
	Rural	13	156.92	1.26	165.71	2.26	8.78	1.14		1.59	5.10	6.69	0.87			
Informatio	City	2	163.40	4.40	168.27	5.88	4.87	0.10		19.33	34.62	53.95	1.08			
	Suburb	2	162.98	4.82	170.95	4.82	7.97	0.16		23.19	23.19	46.38	0.93			
	Town	1	156.19	4.40	‡	†				19.34						
	Rural	1	157.49	3.74	‡	†				14.00						

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Average scale scores for writing, grade 8 by how often students used the delete key [WC30025], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				0 times		1 time or more	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	131	(1.1)	132	(4.9)
			Graduated high school	131	(0.8)	138	(2.9)
			Some education after high school	142	(0.9)	152	(3.3)
			Graduated college	140	(0.8)	151	(2.8)
			Unknown	119	(1.0)	125	(3.7)
		Not eligible	Did not finish high school	141	(2.0)	‡	†
			Graduated high school	147	(1.4)	159	(3.9)
			Some education after high school	157	(1.3)	162	(2.8)
			Graduated college	165	(0.9)	172	(1.2)
			Unknown	135	(1.9)	‡	†
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	145	(4.2)	‡	†
			Some education after high school	155	(4.0)	‡	†
			Graduated college	167	(2.5)	170	(3.2)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.94	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.47	**2.38**	**0.017**
Eligible	Did not finish high	6	131.09	1.08	132.40	4.87	1.31	0.08		1.17	23.70	24.88	1.49			
	Graduated high sc	10	130.72	0.83	137.66	2.88	6.94	0.69		0.69	8.30	8.99	0.90			
	Some education a	8	142.00	0.91	151.57	3.27	9.57	0.77		0.82	10.70	11.52	0.92			
	Graduated college	13	140.31	0.76	150.78	2.85	10.47	1.36		0.57	8.11	8.68	1.13			
	Unknown	6	119.25	1.04	124.79	3.69	5.54	0.33		1.09	13.60	14.68	0.88			
Not eligibl	Did not finish high	1	140.89	2.00	‡	†				4.01						
	Graduated high sc	6	147.47	1.36	159.14	3.91	11.67	0.70		1.85	15.29	17.14	1.03			
	Some education a	7	157.06	1.33	161.60	2.76	4.54	0.32		1.76	7.59	9.36	0.65			
	Graduated college	36	165.33	0.89	172.39	1.19	7.05	2.54		0.80	1.41	2.21	0.79			
	Unknown	2	134.77	1.93	‡	†				3.72						
Informatio	Did not finish high	0	‡	†	‡	†										
	Graduated high sc	0	145.08	4.18	‡	†				17.43						
	Some education a	1	154.86	4.01	‡	†				16.11						
	Graduated college	4	166.68	2.51	170.36	3.24	3.68	0.15		6.28	10.48	16.76	0.67			
	Unknown	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by how often students used the delete key [WC30025], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				0 times		1 time or more	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	142	(0.9)	148	(3.0)
			Black	125	(1.2)	136	(3.8)
			Hispanic	130	(0.7)	139	(2.3)
			Asian	149	(2.8)	‡	†
			American Indian/Alaska Native	122	(4.4)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	141	(1.5)	‡	†
		Not eligible	White	163	(0.9)	171	(1.3)
			Black	143	(1.4)	154	(3.9)
			Hispanic	150	(1.0)	162	(2.3)
			Asian	173	(2.3)	182	(3.4)
			American Indian/Alaska Native	141	(4.8)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	160	(1.5)	169	(4.0)
		Information not available	White	165	(2.6)	173	(3.6)
			Black	141	(3.3)	‡	†
			Hispanic	154	(3.7)	‡	†
			Asian	174	(5.2)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.61	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.81	**2.92**	**0.004**
Eligible	White	13	141.99	0.94	147.80	2.96	5.82	0.76		0.89	8.77	9.66	1.26			
	Black	8	124.65	1.21	135.90	3.80	11.25	0.90		1.47	14.46	15.93	1.27			
	Hispanic	16	130.22	0.72	138.78	2.31	8.56	1.37		0.52	5.34	5.86	0.94			
	Asian	1	149.49	2.80	‡	†				7.82						
	American Indian/A	0	122.32	4.41	‡	†				19.41						
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	3	141.25	1.54	‡	†				2.37						
Not eligible	White	35	163.27	0.89	170.59	1.27	7.32	2.56		0.80	1.62	2.41	0.84			
	Black	3	143.05	1.39	153.99	3.90	10.94	0.33		1.92	15.25	17.17	0.52			
	Hispanic	8	149.82	1.00	162.29	2.28	12.47	1.00		1.00	5.21	6.21	0.50			
	Asian	2	172.76	2.31	181.80	3.41	9.04	0.18		5.34	11.62	16.96	0.34			
	American Indian/A	0	140.65	4.81	‡	†				23.17						
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	3	159.71	1.54	169.08	4.03	9.37	0.28		2.37	16.26	18.63	0.56			
Informatio	White	3	165.46	2.63	173.38	3.56	7.92	0.24		6.94	12.64	19.58	0.59			
	Black	0	141.42	3.29	‡	†				10.85						
	Hispanic	1	153.76	3.72	‡	†				13.83						
	Asian	0	174.47	5.20	‡	†				27.04						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by how often students used the delete key [WC30025], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				0 times		1 time or more	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	129	(1.5)	‡	†
			Graduated high school	131	(1.2)	148	(4.8)
			ducation after high school	144	(1.4)	152	(4.1)
			Graduated college	155	(1.4)	167	(2.0)
			Unknown	120	(1.6)	‡	†
		Suburb	Did not finish high school	136	(1.7)	‡	†
			Graduated high school	140	(1.3)	150	(3.8)
			ducation after high school	149	(1.7)	159	(3.1)
			Graduated college	164	(1.3)	173	(1.6)
			Unknown	128	(1.7)	‡	†
		Town	Did not finish high school	135	(3.3)	‡	†
			Graduated high school	138	(2.3)	‡	†
			ducation after high school	155	(2.0)	‡	†
			Graduated college	155	(1.2)	162	(2.5)
			Unknown	123	(2.9)	‡	†
		Rural	Did not finish high school	135	(2.7)	‡	†
			Graduated high school	139	(1.9)	‡	†
			ducation after high school	150	(1.8)	156	(3.4)
			Graduated college	156	(1.5)	167	(2.6)
			Unknown	125	(2.4)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.37	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.13	**2.76**	**0.006**
City	Did not finish high	3	128.59	1.52	‡	†				2.31						
	Graduated high sc	4	131.01	1.24	147.78	4.80	16.77	0.67		1.54	23.02	24.57	0.98			
	Some education af	4	144.05	1.36	151.93	4.10	7.88	0.32		1.86	16.81	18.67	0.75			
	Graduated college	13	154.72	1.36	166.97	1.99	12.25	1.59		1.86	3.95	5.80	0.75			
	Unknown	3	119.57	1.58	‡	†				2.50						
Suburb	Did not finish high	2	135.50	1.70	‡	†				2.91						
	Graduated high sc	5	139.98	1.33	149.70	3.81	9.72	0.49		1.77	14.50	16.27	0.81			
	Some education af	6	149.50	1.66	159.15	3.15	9.65	0.58		2.75	9.90	12.66	0.76			
	Graduated college	22	164.45	1.32	172.68	1.61	8.24	1.81		1.73	2.59	4.33	0.95			
	Unknown	3	127.90	1.72	‡	†				2.95						
Town	Did not finish high	1	134.57	3.33	‡	†				11.09						
	Graduated high sc	2	137.85	2.29	‡	†				5.25						
	Some education af	2	155.12	2.04	‡	†				4.16						
	Graduated college	6	155.16	1.20	162.33	2.52	7.17	0.43		1.43	6.35	7.78	0.47			
	Unknown	1	122.63	2.86	‡	†				8.18						
Rural	Did not finish high	1	134.97	2.72	‡	†				7.42						
	Graduated high sc	4	139.14	1.91	‡	†				3.64						
	Some education af	4	150.44	1.83	155.92	3.41	5.49	0.22		3.34	11.60	14.94	0.60			
	Graduated college	12	156.48	1.50	167.04	2.56	10.56	1.27		2.24	6.54	8.79	1.05			
	Unknown	2	125.17	2.36	‡	†				5.55						

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the delete key [WC30025], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				0 times		1 time or more	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	159	(1.5)	170	(2.0)
			Black	126	(1.8)	136	(5.6)
			Hispanic	134	(1.2)	147	(3.3)
			Asian	160	(2.5)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	148	(2.1)	‡	†
		Suburb	White	164	(1.4)	171	(1.9)
			Black	134	(1.7)	146	(5.2)
			Hispanic	139	(1.2)	152	(2.8)
			Asian	173	(2.7)	184	(4.7)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	155	(2.1)	‡	†
		Town	White	153	(1.4)	156	(3.3)
			Black	128	(3.6)	‡	†
			Hispanic	136	(2.0)	‡	†
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(3.0)	‡	†
		Rural	White	153	(1.3)	163	(2.9)
			Black	132	(3.4)	‡	†
			Hispanic	140	(1.6)	151	(3.8)
			Asian	172	(3.6)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(2.5)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.54	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	10.40	2.65	0.008
City	White	9	158.66	1.52	170.17	1.96	11.51	1.04		2.30	3.83	6.12	0.55			
	Black	5	126.40	1.77	136.07	5.65	9.68	0.48		3.13	31.88	35.01	1.75			
	Hispanic	10	133.79	1.21	147.07	3.31	13.28	1.33		1.47	10.92	12.40	1.24			
	Asian	2	159.77	2.47	‡	†				6.10						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	2	147.50	2.08	‡	†				4.31						
Suburb	White	20	163.66	1.44	171.49	1.90	7.84	1.57		2.07	3.59	5.67	1.13			
	Black	4	133.87	1.74	146.05	5.21	12.18	0.49		3.02	27.15	30.17	1.21			
	Hispanic	10	139.24	1.19	152.00	2.80	12.76	1.28		1.43	7.84	9.27	0.93			
	Asian	2	172.70	2.73	183.60	4.71	10.90	0.22		7.44	22.17	29.61	0.59			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	155.30	2.12	‡	†				4.47						
Town	White	8	153.29	1.40	156.32	3.30	3.03	0.24		1.96	10.89	12.84	1.03			
	Black	1	128.47	3.62	‡	†				13.12						
	Hispanic	2	136.07	2.04	‡	†				4.14						
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	148.70	3.01	‡	†				9.05						
Rural	White	15	152.87	1.28	163.17	2.86	10.30	1.55		1.64	8.16	9.80	1.47			
	Black	2	132.03	3.35	‡	†				11.23						
	Hispanic	3	139.70	1.61	151.49	3.78	11.79	0.35		2.59	14.28	16.88	0.51			
	Asian	0	172.25	3.57	‡	†				12.75						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	148.59	2.48	‡	†				6.13						

National Center for Education Statistics (NCES)
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National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the delete key [WC30025], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				0 times		1 time or more	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	138	(2.0)	‡	†
			Black	115	(2.6)	‡	†
			Hispanic	132	(1.1)	‡	†
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	148	(5.0)	‡	†
		Graduated high school	White	145	(1.3)	155	(2.9)
			Black	122	(1.8)	‡	†
			Hispanic	133	(1.2)	140	(4.1)
			Asian	150	(7.1)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	139	(2.6)	‡	†
		Some education after high school	White	156	(1.2)	162	(2.4)
			Black	136	(1.8)	‡	†
			Hispanic	144	(1.4)	153	(3.4)
			Asian	166	(3.8)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	150	(2.5)	‡	†
		Graduated college	White	165	(0.9)	172	(1.4)
			Black	137	(1.4)	149	(4.4)
			Hispanic	149	(1.1)	162	(2.5)
			Asian	172	(2.1)	180	(3.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	158	(1.4)	167	(4.0)
		Unknown	White	130	(1.7)	‡	†
			Black	114	(2.3)	‡	†
			Hispanic	119	(1.2)	124	(4.6)
			Asian	148	(4.2)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	131	(3.7)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.46	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.30	2.39	0.017
Did not fin	White	2	138.11	1.97	‡	†				3.87						
	Black	1	115.34	2.60	‡	†				6.76						
	Hispanic	4	131.79	1.11	‡	†				1.23						
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	147.55	5.03	‡	†				25.34						
Graduated	White	7	144.79	1.35	154.75	2.87	9.96	0.70		1.81	8.23	10.04	0.70			
	Black	2	121.92	1.76	‡	†				3.09						
	Hispanic	5	132.75	1.22	139.61	4.07	6.87	0.34		1.49	16.54	18.03	0.90			
	Asian	0	149.92	7.11	‡	†				50.56						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	139.50	2.61	‡	†				6.80						
Some edu	White	7	155.77	1.22	161.59	2.45	5.82	0.41		1.48	5.98	7.46	0.52			
	Black	2	136.12	1.82	‡	†				3.32						
	Hispanic	4	143.64	1.37	153.47	3.45	9.83	0.39		1.87	11.87	13.74	0.55			
	Asian	0	165.87	3.79	‡	†				14.35						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	149.71	2.50	‡	†				6.27						
Graduated	White	33	165.23	0.89	171.66	1.39	6.42	2.12		0.79	1.93	2.72	0.90			
	Black	5	136.84	1.39	149.13	4.42	12.29	0.61		1.94	19.54	21.48	1.07			
	Hispanic	8	148.85	1.14	162.13	2.52	13.28	1.06		1.31	6.33	7.63	0.61			
	Asian	3	171.68	2.06	179.98	3.07	8.29	0.25		4.25	9.41	13.66	0.41			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	4	157.55	1.41	167.32	4.02	9.78	0.39		1.99	16.13	18.12	0.72			
Unknown	White	3	130.33	1.75	‡	†				3.06						
	Black	1	113.57	2.30	‡	†				5.27						
	Hispanic	4	118.98	1.23	123.56	4.59	4.59	0.18		1.50	21.09	22.59	0.90			
	Asian	0	148.12	4.21	‡	†				17.70						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	130.74	3.74	‡	†				14.00						

Appendix C.3

Paste Function Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the paste function (collapsed) [WC30004], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3] : 2011

Gender	National School Lunch Program eligibility, 3 categories	Percentage	paste low use (collapsed)		paste high use (collapsed)	
			Average scale score	Standard error	Average scale score	Standard error
Male	Eligible	21	125	(0.7)	116	(2.4)
	Not eligible	27	152	(0.9)	144	(2.8)
	Information not available	3	154	(2.7)	‡	‡
Female	Eligible	21	144	(0.6)	136	(3.3)
	Not eligible	26	171	(0.8)	172	(2.4)
	Information not available	3	171	(2.6)	‡	‡

Confounding Groupings			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT		
Parent's Education	Gender	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-5.67	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.72	*test statistic*	*p*
Male	Eligible	21	125.24	0.67	116.46	2.42	-8.78	-1.84		0.44	5.85	6.29	1.32		-2.04	0.041
	Not eligible	27	151.58	0.88	144.06	2.81	-7.52	-2.03		0.78	7.90	8.67	2.34			
	Information not available	0	154.44	2.67			-154.44	0.00		7.12	0.00	7.12	0.00			
Female	Eligible	21	144.34	0.64	135.57	3.31	-8.77	-1.84		0.41	10.93	11.34	2.38			
	Not eligible	26	171.44	0.81	171.62	2.41	0.18	0.05		0.66	5.79	6.45	1.68			
	Information not available	0	171.42	2.55			-171.42	0.00		6.51	0.00	6.51	0.00			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the paste function (collapsed) [WC30004], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	123	(1.0)	‡	†
			Graduated high school	129	(1.1)	113	(5.5)
			Some education after high school	139	(1.0)	126	(4.9)
			Graduated college	151	(0.9)	145	(2.3)
			Unknown	116	(1.2)	‡	†
		Female	Did not finish high school	142	(1.2)	‡	†
			Graduated high school	148	(0.8)	‡	†
			Some education after high school	161	(1.0)	154	(4.4)
			Graduated college	170	(0.8)	169	(3.1)
			Unknown	135	(1.2)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-4.86	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	10.21	**-1.52**	**0.129**
Male	Did not finish high school	0	123.48	1.04	0.00	0.00	-123.48	0.00		1.08	0.00	1.08	0.00			
	Graduated high school	8	128.77	1.08	112.95	5.45	-15.83	-1.27		1.16	29.75	30.91	2.47			
	Some education after high school	7	138.88	0.96	126.48	4.94	-12.40	-0.87		0.93	24.44	25.36	1.78			
	Graduated college	27	151.44	0.89	145.11	2.30	-6.32	-1.71		0.80	5.29	6.09	1.64			
	Unknown	0	116.08	1.24	0.00	0.00	-116.08	0.00		1.54	0.00	1.54	0.00			
Female	Did not finish high school	0	141.71	1.18	0.00	0.00	-141.71	0.00		1.38	0.00	1.38	0.00			
	Graduated high school	0	148.02	0.84	0.00	0.00	-148.02	0.00		0.70	0.00	0.70	0.00			
	Some education after high school	8	160.78	0.98	153.99	4.38	-6.79	-0.54		0.97	19.22	20.19	1.62			
	Graduated college	26	170.44	0.78	168.62	3.13	-1.82	-0.47		0.60	9.81	10.41	2.71			
	Unknown	0	135.30	1.19	0.00	0.00	-135.30	0.00		1.43	0.00	1.43	0.00			

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the paste function (collapsed) [WC30004], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	135	(1.3)	129	(3.9)
			Suburb	146	(1.3)	135	(3.3)
			Town	139	(1.8)	‡	†
			Rural	140	(1.5)	129	(3.9)
		Female	City	153	(1.2)	139	(3.3)
			Suburb	165	(1.3)	158	(4.5)
			Town	159	(1.2)	‡	†
			Rural	160	(1.4)	164	(4.6)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-6.92	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	15.32	**-1.77**	**0.077**
Male	City	14	135.21	1.31	129.32	3.85	-5.89	-0.82		1.72	14.84	16.56	2.32			
	Suburb	19	145.84	1.30	135.25	3.29	-10.60	-2.01		1.70	10.84	12.54	2.38			
	Town	0	138.68	1.80	0.00	0.00	-138.68	0.00		3.23	0.00	3.23	0.00			
	Rural	12	140.30	1.47	129.15	3.89	-11.15	-1.34		2.16	15.17	17.33	2.08			
Female	City	14	153.23	1.21	139.47	3.34	-13.76	-1.93		1.46	11.13	12.59	1.76			
	Suburb	19	165.07	1.31	158.42	4.55	-6.64	-1.26		1.71	20.69	22.40	4.26			
	Town	0	159.09	1.22	0.00	0.00	-159.09	0.00		1.49	0.00	1.49	0.00			
	Rural	11	159.99	1.43	164.00	4.57	4.01	0.44		2.05	20.86	22.91	2.52			

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National Assessment of Educational Progress (NAEP)
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Average scale scores for writing, grade 8 by how often students used the paste function (collapsed) [WC30004], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	149	(0.9)	146	(3.3)
			Black	123	(1.2)	113	(3.5)
			Hispanic	129	(0.8)	116	(3.6)
			Asian	159	(2.1)	‡	†
			American Indian/Alaska Native	125	(3.8)	‡	†
			Native Hawaiian/Other Pacific Islander	123	(5.2)	‡	†
			Two or more races	142	(1.5)	‡	†
		Female	White	169	(0.8)	168	(3.5)
			Black	140	(1.4)	128	(4.4)
			Hispanic	147	(0.7)	145	(4.3)
			Asian	175	(2.0)	‡	†
			American Indian/Alaska Native	143	(4.3)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	162	(1.3)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-4.47	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	12.34	-1.27	0.203
Male	White	26	149.40	0.94	146.13	3.27	-3.27	-0.85		0.89	10.67	11.56	3.01			
	Black	6	123.40	1.19	113.20	3.49	-10.20	-0.61		1.41	12.15	13.55	0.81			
	Hispanic	13	129.21	0.79	116.46	3.60	-12.75	-1.66		0.62	12.98	13.60	1.77			
	Asian	2	159.04	2.14	‡	†				4.57						
	American Indian/Alaska Native	0	125.16	3.83	‡	†				14.64						
	Native Hawaiian/Other Pacific Isla	0	122.97	5.17	‡	†				26.74						
	Two or more races	3	141.78	1.47	‡	†				2.16						
Female	White	25	169.28	0.80	168.11	3.49	-1.17	-0.29		0.63	12.15	12.78	3.20			
	Black	6	140.21	1.42	127.61	4.42	-12.60	-0.76		2.01	19.55	21.56	1.29			
	Hispanic	12	147.46	0.73	144.93	4.28	-2.53	-0.30		0.54	18.32	18.85	2.26			
	Asian	2	175.07	1.96	‡	†				3.85						
	American Indian/Alaska Native	0	143.32	4.25	‡	†				18.10						
	Native Hawaiian/Other Pacific Isla	0	‡	†	‡	†										
	Two or more races	3	162.00	1.33	‡	†				1.78						

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Average scale scores for writing, grade 8 by how often students used the paste function (collapsed) [WC30004], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	h Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	130	(1.0)	120	(2.7)
			Suburb	137	(0.9)	127	(4.4)
			Town	138	(1.3)	‡	†
			Rural	137	(1.5)	127	(4.6)
		Not eligible	City	160	(1.3)	153	(4.4)
			Suburb	165	(1.3)	157	(3.5)
			Town	156	(1.4)	‡	†
			Rural	158	(1.3)	160	(4.0)
		Information not available	City	164	(4.4)	‡	†
			Suburb	164	(4.4)	‡	†
			Town	157	(4.1)	‡	†
			Rural	159	(5.3)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-6.05	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	13.52	-1.65	0.100
Eligible	City	15	130.21	0.97	119.63	2.67	-10.59	-1.59		0.94	7.13	8.08	1.21			
	Suburb	13	137.00	0.93	126.99	4.38	-10.01	-1.30		0.86	19.15	20.01	2.60			
	Town	0	137.60	1.32	0.00	0.00	-137.60	0.00		1.74	0.00	1.74	0.00			
	Rural	9	137.47	1.51	127.19	4.65	-10.28	-0.93		2.27	21.61	23.88	2.15			
Not eligible	City	10	159.89	1.35	152.58	4.36	-7.32	-0.73		1.82	19.00	20.82	2.08			
	Suburb	23	165.33	1.35	157.42	3.47	-7.91	-1.82		1.82	12.01	13.83	3.18			
	Town	0	156.47	1.39	0.00	0.00	-156.47	0.00		1.92	0.00	1.92	0.00			
	Rural	13	157.94	1.33	160.33	3.99	2.39	0.31		1.76	15.92	17.68	2.30			
Information not available	City	0	164.15	4.38	0.00	0.00	-164.15	0.00		19.20	0.00	19.20	0.00			
	Suburb	0	164.22	4.45	0.00	0.00	-164.22	0.00		19.80	0.00	19.80	0.00			
	Town	0	157.41	4.11	0.00	0.00	-157.41	0.00		16.89	0.00	16.89	0.00			
	Rural	0	158.79	5.30	0.00	0.00	-158.79	0.00		28.09	0.00	28.09	0.00			

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Average scale scores for writing, grade 8 by how often students used the paste function (collapsed) [WC30004], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year gram eligibility, 3 categories al education level, from 2 questions			Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	132	(1.0)	119	(5.2)
			Graduated high school	132	(0.8)	120	(4.4)
			Some education after high school	143	(0.9)	132	(3.9)
			Graduated college	141	(0.8)	135	(3.7)
			Unknown	120	(1.1)	108	(4.9)
		Not eligible	Did not finish high school	143	(2.0)	‡	†
			Graduated high school	149	(1.3)	‡	†
			Some education after high school	158	(1.2)	‡	†
			Graduated college	167	(0.9)	163	(2.1)
			Unknown	136	(1.9)	‡	†
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	146	(4.4)	‡	†
			Some education after high school	155	(3.8)	‡	†
			Graduated college	168	(2.3)	‡	†
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			**Control Group**		**Treatment Group**		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-5.58	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	10.19	**-1.75**	**0.080**
Eligible	Did not finish high school	6	131.69	1.00	119.42	5.19	-12.26	-0.74		0.99	26.89	27.88	1.67			
	Graduated high school	10	131.61	0.78	119.87	4.40	-11.75	-1.17		0.61	19.35	19.96	2.00			
	Some education after high school	8	143.11	0.87	131.83	3.90	-11.27	-0.90		0.76	15.21	15.97	1.28			
	Graduated college	13	141.42	0.80	135.45	3.65	-5.97	-0.78		0.65	13.35	14.00	1.82			
	Unknown	6	120.09	1.10	108.03	4.85	-12.07	-0.72		1.21	23.54	24.75	1.48			
Not eligible	Did not finish high school	0	142.91	2.03	0.00	0.00	-142.91	0.00		4.11	0.00	4.11	0.00			
	Graduated high school	0	148.78	1.35	0.00	0.00	-148.78	0.00		1.81	0.00	1.81	0.00			
	Some education after high school	0	157.63	1.24	0.00	0.00	-157.63	0.00		1.54	0.00	1.54	0.00			
	Graduated college	36	166.51	0.89	162.98	2.14	-3.53	-1.27		0.80	4.59	5.39	1.94			
	Unknown	0	136.41	1.93	0.00	0.00	-136.41	0.00		3.74	0.00	3.74	0.00			
Information not available	Did not finish high school	0	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00			
	Graduated high school	0	146.08	4.40	0.00	0.00	-146.08	0.00		19.38	0.00	19.38	0.00			
	Some education after high school	0	154.89	3.83	0.00	0.00	-154.89	0.00		14.65	0.00	14.65	0.00			
	Graduated college	0	167.52	2.32	0.00	0.00	-167.52	0.00		5.37	0.00	5.37	0.00			
	Unknown	0	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00			

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Average scale scores for writing, grade 8 by how often students used the paste function (collapsed) [WC30004], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	unch Program eligibility, 3 categoriesty using 2011 guidelines, student-reported		Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	143	(1.0)	139	(4.5)
			Black	126	(1.2)	113	(3.3)
			Hispanic	131	(0.7)	123	(3.0)
			Asian	151	(2.7)	‡	†
			American Indian/Alaska Native	123	(4.6)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	142	(1.5)	‡	†
		Not eligible	White	164	(0.9)	160	(2.8)
			Black	144	(1.4)	‡	†
			Hispanic	151	(1.0)	146	(5.6)
			Asian	175	(2.0)	‡	†
			American Indian/Alaska Native	141	(4.2)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	161	(1.6)	‡	†
		Information not available	White	167	(2.5)	‡	†
			Black	143	(3.9)	‡	†
			Hispanic	154	(3.5)	‡	†
			Asian	175	(4.8)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	158	(4.2)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-4.61	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	10.77	**-1.40**	**0.160**
Eligible	White	13	142.58	0.96	138.99	4.48	-3.60	-0.47		0.91	20.03	20.94	2.72			
	Black	8	125.93	1.22	112.57	3.34	-13.36	-1.07		1.50	11.18	12.68	1.01			
	Hispanic	16	131.12	0.68	123.13	2.98	-7.99	-1.28		0.46	8.85	9.32	1.49			
	Asian	1	150.97	2.72	‡	†				7.43						
	American Indian/A	0	123.03	4.61	‡	†				21.22						
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	141.95	1.54	‡	†				2.38						
Not eligible	White	35	164.41	0.90	160.46	2.77	-3.95	-1.38		0.82	7.67	8.48	2.97			
	Black	3	144.33	1.35	‡	†				1.83						
	Hispanic	8	151.37	1.04	146.26	5.57	-5.11	-0.41		1.09	31.05	32.14	2.57			
	Asian	2	174.66	2.01	‡	†				4.04						
	American Indian/A	0	140.64	4.25	‡	†				18.02						
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	161.08	1.57	‡	†				2.48						
Information not a	White	3	167.03	2.45	‡	†				6.02						
	Black	0	142.99	3.86	‡	†				14.93						
	Hispanic	1	154.06	3.48	‡	†				12.11						
	Asian	0	175.01	4.81	‡	†				23.13						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	158.48	4.20	‡	†				17.68						

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Average scale scores for writing, grade 8 by how often students used the paste function (collapsed) [WC30004], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	161	(1.5)	151	(6.8)
			Black	127	(1.8)	‡	†
			Hispanic	135	(1.2)	124	(3.7)
			Asian	162	(2.4)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(1.8)	‡	†
		Suburb	White	165	(1.4)	160	(4.0)
			Black	136	(1.6)	‡	†
			Hispanic	141	(1.2)	134	(5.5)
			Asian	175	(2.5)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	157	(2.2)	‡	†
		Town	White	154	(1.3)	‡	†
			Black	132	(3.0)	‡	†
			Hispanic	137	(1.6)	‡	†
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	151	(3.2)	‡	†
		Rural	White	154	(1.3)	158	(4.4)
			Black	134	(3.6)	‡	†
			Hispanic	141	(1.6)	‡	†
			Asian	174	(2.9)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(2.5)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-2.97	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	15.78	-0.75	0.455
City	White	9	160.58	1.45	151.45	6.78	-9.13	-0.82		2.11	45.91	48.02	4.32			
	Black	5	127.28	1.81	‡	†				3.27						
	Hispanic	10	135.21	1.20	124.36	3.71	-10.84	-1.08		1.45	13.77	15.22	1.52			
	Asian	2	161.64	2.40	‡	†				5.78						
	American Indian/Alaska	0	‡	†	‡	†										
	Native Hawaiian/Other	0	‡	†	‡	†										
	Two or more races	2	148.85	1.84	‡	†				3.39						
Suburb	White	20	164.91	1.42	159.89	3.97	-5.03	-1.01		2.03	15.77	17.80	3.56			
	Black	4	135.72	1.57	‡	†				2.47						
	Hispanic	10	140.59	1.19	133.73	5.52	-6.86	-0.69		1.41	30.49	31.89	3.19			
	Asian	2	174.57	2.50	‡	†				6.27						
	American Indian/Alaska	0	‡	†	‡	†										
	Native Hawaiian/Other	0	‡	†	‡	†										
	Two or more races	3	156.59	2.19	‡	†				4.79						
Town	White	8	153.81	1.28	‡	†				1.65						
	Black	1	131.54	2.98	‡	†				8.89						
	Hispanic	2	137.32	1.63	‡	†				2.65						
	Asian	0	‡	†	‡	†										
	American Indian/Alaska	0	‡	†	‡	†										
	Native Hawaiian/Other	0	‡	†	‡	†										
	Two or more races	1	151.05	3.20	‡	†				10.22						
Rural	White	15	153.91	1.34	158.13	4.41	4.22	0.63		1.79	19.44	21.23	3.18			
	Black	2	133.74	3.59	‡	†				12.89						
	Hispanic	3	141.07	1.61	‡	†				2.59						
	Asian	0	173.87	2.90	‡	†				8.42						
	American Indian/Alaska	0	‡	†	‡	†										
	Native Hawaiian/Other	0	‡	†	‡	†										
	Two or more races	1	149.23	2.48	‡	†				6.17						

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Average scale scores for writing, grade 8 by how often students used the paste function (collapsed) [WC30004], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	139	(1.9)	‡	†
			Black	117	(2.9)	‡	†
			Hispanic	132	(1.1)	‡	†
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(5.1)	‡	†
		Graduated high school	White	146	(1.3)	‡	†
			Black	123	(1.8)	‡	†
			Hispanic	134	(1.2)	‡	†
			Asian	151	(6.9)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	141	(2.7)	‡	†
		Some education after high school	White	156	(1.1)	‡	†
			Black	137	(1.8)	‡	†
			Hispanic	145	(1.4)	‡	†
			Asian	167	(3.8)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	151	(2.4)	‡	†
		Graduated college	White	166	(0.9)	164	(2.7)
			Black	138	(1.3)	‡	†
			Hispanic	151	(1.1)	145	(4.7)
			Asian	174	(1.7)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	159	(1.5)	‡	†
		Unknown	White	132	(1.8)	‡	†
			Black	115	(2.4)	‡	†
			Hispanic	120	(1.2)	‡	†
			Asian	149	(4.5)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	131	(3.5)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-1.11	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.60	-0.52	0.605
Did not finish high school	White	2	139.47	1.92	‡	†				3.70						
	Black	1	116.60	2.86	‡	†				8.18						
	Hispanic	4	132.35	1.07	‡	†				1.14						
	Asian	0	‡	†	‡	†										
	American Indian/Al	0	‡	†	‡	†										
	Native Hawaiian/Ot	0	‡	†	‡	†										
	Two or more races	0	149.15	5.06	‡	†				25.56						
Graduated high school	White	7	145.68	1.30	‡	†				1.68						
	Black	2	123.36	1.79	‡	†				3.21						
	Hispanic	5	133.71	1.19	‡	†				1.41						
	Asian	0	150.52	6.88	‡	†				47.37						
	American Indian/Al	0	‡	†	‡	†										
	Native Hawaiian/Ot	0	‡	†	‡	†										
	Two or more races	1	140.93	2.75	‡	†				7.54						
Some education after high s	White	7	156.48	1.09	‡	†				1.18						
	Black	2	137.01	1.79	‡	†				3.19						
	Hispanic	4	144.89	1.39	‡	†				1.93						
	Asian	0	167.27	3.75	‡	†				14.08						
	American Indian/Al	0	‡	†	‡	†										
	Native Hawaiian/Ot	0	‡	†	‡	†										
	Two or more races	1	150.53	2.37	‡	†				5.62						
Graduated college	White	33	166.24	0.90	164.17	2.75	-2.07	-0.68		0.81	7.54	8.35	2.76			
	Black	5	138.32	1.32	‡	†				1.75						
	Hispanic	8	150.61	1.09	145.27	4.68	-5.34	-0.43		1.20	21.87	23.07	1.85			
	Asian	3	173.69	1.66	‡	†				2.76						
	American Indian/Al	0	‡	†	‡	†										
	Native Hawaiian/Ot	0	‡	†	‡	†										
	Two or more races	4	158.80	1.50	‡	†				2.24						
Unknown	White	3	131.85	1.82	‡	†				3.30						
	Black	1	114.69	2.37	‡	†				5.62						
	Hispanic	4	119.73	1.21	‡	†				1.47						
	Asian	0	149.06	4.48	‡	†				20.09						
	American Indian/Al	0	‡	†	‡	†										
	Native Hawaiian/Ot	0	‡	†	‡	†										
	Two or more races	0	131.01	3.46	‡	†				11.98						

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the paste function (collapsed) [WC30004], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	161	(1.5)	151	(6.8)
			Black	127	(1.8)	‡	†
			Hispanic	135	(1.2)	124	(3.7)
			Asian	162	(2.4)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(1.8)	‡	†
		Suburb	White	165	(1.4)	160	(4.0)
			Black	136	(1.6)	‡	†
			Hispanic	141	(1.2)	134	(5.5)
			Asian	175	(2.5)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	157	(2.2)	‡	†
		Town	White	154	(1.3)	‡	†
			Black	132	(3.0)	‡	†
			Hispanic	137	(1.6)	‡	†
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	151	(3.2)	‡	†
		Rural	White	154	(1.3)	158	(4.4)
			Black	134	(3.6)	‡	†
			Hispanic	141	(1.6)	‡	†
			Asian	174	(2.9)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(2.5)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-2.97	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	15.78	-0.75	0.455
City	White	9	160.58	1.45	151.45	6.78	-9.13	-0.82		2.11	45.91	48.02	4.32			
	Black	5	127.28	1.81	‡	†				3.27						
	Hispanic	10	135.21	1.20	124.36	3.71	-10.84	-1.08		1.45	13.77	15.22	1.52			
	Asian	2	161.64	2.40	‡	†				5.78						
	American Indian/Alaska	0	‡	†	‡	†										
	Native Hawaiian/Other	0	‡	†	‡	†										
	Two or more races	2	148.85	1.84	‡	†				3.39						
Suburb	White	20	164.91	1.42	159.89	3.97	-5.03	-1.01		2.03	15.77	17.80	3.56			
	Black	4	135.72	1.57	‡	†				2.47						
	Hispanic	10	140.59	1.19	133.73	5.52	-6.86	-0.69		1.41	30.49	31.89	3.19			
	Asian	2	174.57	2.50	‡	†				6.27						
	American Indian/Alaska	0	‡	†	‡	†										
	Native Hawaiian/Other	0	‡	†	‡	†										
	Two or more races	3	156.59	2.19	‡	†				4.79						
Town	White	8	153.81	1.28	‡	†				1.65						
	Black	1	131.54	2.98	‡	†				8.89						
	Hispanic	2	137.32	1.63	‡	†				2.65						
	Asian	0	‡	†	‡	†										
	American Indian/Alaska	0	‡	†	‡	†										
	Native Hawaiian/Other	0	‡	†	‡	†										
	Two or more races	1	151.05	3.20	‡	†				10.22						
Rural	White	15	153.91	1.34	158.13	4.41	4.22	0.63		1.79	19.44	21.23	3.18			
	Black	2	133.74	3.59	‡	†				12.89						
	Hispanic	3	141.07	1.61	‡	†				2.59						
	Asian	0	173.87	2.90	‡	†				8.42						
	American Indian/Alaska	0	‡	†	‡	†										
	Native Hawaiian/Other	0	‡	†	‡	†										
	Two or more races	1	149.23	2.48	‡	†				6.17						

Appendix C.4

Spell Check Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the spell check function (collapsed) [WC300101], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	low use (collapsed)		high use (collapsed)	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	127	(0.8)	121	(0.7)
			Not eligible	153	(0.9)	147	(1.1)
			Information not available	156	(2.7)	149	(3.5)
		Female	Eligible	147	(0.8)	139	(0.9)
			Not eligible	174	(0.9)	165	(1.2)
			Information not available	174	(2.8)	162	(3.1)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT		
Gender	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-7.46	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	2.76	*test statistic*	*p*
Male	Eligible	21	127.10	0.82	121.22	0.73	-5.88	-1.23		0.67	0.53	1.21	0.25		-4.49	0.000
	Not eligible	27	153.26	0.92	146.57	1.12	-6.69	-1.81		0.84	1.26	2.10	0.57			
	Information not av	3	155.80	2.66	149.12	3.46	-6.68	-0.20		7.08	12.00	19.08	0.57			
Female	Eligible	21	147.01	0.77	139.12	0.86	-7.89	-1.66		0.60	0.74	1.34	0.28			
	Not eligible	26	173.83	0.89	165.34	1.17	-8.49	-2.21		0.79	1.37	2.16	0.56			
	Information not av	3	173.89	2.79	162.20	3.10	-11.68	-0.35		7.77	9.62	17.39	0.52			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the spell check function (collapsed) [WC30010], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	138	(1.4)	129	(1.5)
			Suburb	149	(1.4)	138	(1.4)
			Town	139	(1.8)	136	(2.5)
			Rural	143	(1.6)	135	(1.5)
		Female	City	157	(1.3)	145	(1.5)
			Suburb	168	(1.3)	156	(1.5)
			Town	161	(1.4)	154	(2.0)
			Rural	163	(1.6)	154	(1.8)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-9.93	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.81	**-4.53**	**0.000**
Male	City	14	138.48	1.41	128.74	1.55	-9.74	-1.36		1.99	2.39	4.38	0.61			
	Suburb	19	148.55	1.41	138.29	1.42	-10.26	-1.95		1.99	2.02	4.01	0.76			
	Town	6	139.34	1.78	135.52	2.48	-3.82	-0.23		3.18	6.14	9.32	0.56			
	Rural	12	142.62	1.55	134.77	1.53	-7.84	-0.94		2.42	2.33	4.75	0.57			
Female	City	14	157.27	1.34	144.69	1.48	-12.58	-1.76		1.79	2.20	4.00	0.56			
	Suburb	19	168.36	1.33	156.29	1.52	-12.07	-2.29		1.77	2.31	4.08	0.78			
	Town	6	161.19	1.38	153.81	1.99	-7.38	-0.44		1.92	3.98	5.89	0.35			
	Rural	11	163.04	1.58	154.42	1.76	-8.62	-0.95		2.49	3.09	5.58	0.61			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the spell check function (collapsed) [WC30010], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	124	(1.3)	121	(2.1)
			Graduated high school	130	(1.4)	125	(1.5)
			Some education after high school	141	(1.2)	133	(1.5)
			Graduated college	153	(0.9)	146	(1.1)
			Unknown	118	(1.4)	112	(1.7)
		Female	Did not finish high school	144	(1.6)	137	(1.5)
			Graduated high school	151	(1.0)	143	(1.5)
			Some education after high school	163	(1.1)	156	(1.4)
			Graduated college	174	(0.9)	162	(1.0)
			Unknown	139	(1.5)	129	(1.8)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-8.30	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.00	**-4.79**	**0.000**
Male	Did not finish high	3	124.21	1.31	121.23	2.08	-2.98	-0.09		1.73	4.34	6.07	0.18			
	Graduated high sc	8	130.20	1.38	124.82	1.50	-5.37	-0.43		1.92	2.24	4.16	0.33			
	Some education af	7	141.04	1.20	133.29	1.50	-7.75	-0.54		1.43	2.25	3.68	0.26			
	Graduated college	27	153.49	0.92	145.62	1.12	-7.87	-2.12		0.85	1.26	2.11	0.57			
	Unknown	5	118.16	1.41	111.57	1.72	-6.59	-0.33		1.97	2.96	4.93	0.25			
Female	Did not finish high	4	143.99	1.57	136.77	1.54	-7.22	-0.29		2.47	2.36	4.83	0.19			
	Graduated high sc	8	150.70	1.01	142.50	1.47	-8.20	-0.66		1.01	2.17	3.18	0.25			
	Some education af	8	162.80	1.10	156.02	1.44	-6.79	-0.54		1.21	2.09	3.30	0.26			
	Graduated college	26	173.58	0.88	162.40	1.03	-11.18	-2.91		0.77	1.07	1.84	0.48			
	Unknown	4	138.60	1.53	128.91	1.81	-9.68	-0.39		2.35	3.28	5.63	0.23			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the spell check function (collapsed) [WC30010], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	151	(1.0)	144	(1.2)
			Black	125	(1.4)	120	(1.5)
			Hispanic	132	(1.0)	124	(1.1)
			Asian	160	(2.6)	151	(4.0)
			American Indian/Alaska Native	127	(4.0)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	143	(1.9)	139	(2.7)
		Female	White	172	(0.9)	164	(1.0)
			Black	143	(1.6)	135	(1.8)
			Hispanic	151	(0.9)	141	(1.0)
			Asian	177	(2.0)	167	(4.7)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	165	(1.4)	155	(2.2)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-7.66	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.70	-3.98	0.000
Male	White	26	151.45	0.97	144.11	1.19	-7.34	-1.91		0.94	1.41	2.36	0.61			
	Black	6	125.06	1.44	119.53	1.54	-5.52	-0.33		2.08	2.37	4.45	0.27			
	Hispanic	13	131.57	0.98	123.90	1.06	-7.67	-1.00		0.96	1.12	2.07	0.27			
	Asian	2	159.91	2.61	151.35	4.03	-8.55	-0.17		6.82	16.26	23.09	0.46			
	American Indian/A	0	126.74	3.96	‡	†				15.65						
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	3	142.58	1.90	138.77	2.66	-3.81	-0.11		3.61	7.08	10.68	0.32			
Female	White	25	171.53	0.94	163.50	0.96	-8.03	-2.01		0.88	0.91	1.80	0.45			
	Black	6	143.31	1.64	134.84	1.79	-8.48	-0.51		2.70	3.22	5.92	0.36			
	Hispanic	12	150.77	0.93	141.34	1.05	-9.43	-1.13		0.86	1.10	1.95	0.23			
	Asian	2	176.69	1.97	167.50	4.72	-9.19	-0.18		3.87	22.24	26.12	0.52			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	3	165.43	1.44	155.01	2.20	-10.42	-0.31		2.07	4.86	6.93	0.21			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the spell check function (collapsed) [WC30010], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	132	(1.2)	126	(1.1)
			Suburb	139	(1.2)	131	(1.2)
			Town	139	(1.8)	135	(2.3)
			Rural	139	(1.7)	134	(1.5)
		Not eligible	City	162	(1.5)	154	(1.8)
			Suburb	168	(1.3)	158	(1.7)
			Town	157	(1.5)	154	(1.9)
			Rural	160	(1.5)	153	(1.4)
		Information not available	City	167	(4.3)	156	(4.7)
			Suburb	167	(4.6)	156	(5.0)
			Town	159	(4.1)	‡	†
			Rural	158	(6.6)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-7.21	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.86	**-2.98**	**0.003**
Eligible	City	15	132.45	1.18	125.96	1.12	-6.49	-0.97		1.40	1.25	2.65	0.40			
	Suburb	13	139.49	1.20	131.32	1.18	-8.17	-1.06		1.44	1.39	2.83	0.37			
	Town	5	138.70	1.75	134.59	2.28	-4.11	-0.21		3.07	5.19	8.26	0.41			
	Rural	9	139.49	1.68	133.53	1.51	-5.97	-0.54		2.83	2.27	5.10	0.46			
Not eligibl	City	10	162.02	1.47	154.27	1.85	-7.75	-0.77		2.15	3.41	5.56	0.56			
	Suburb	23	167.55	1.30	158.36	1.67	-9.19	-2.11		1.70	2.78	4.48	1.03			
	Town	6	157.28	1.48	153.66	1.91	-3.63	-0.22		2.18	3.65	5.83	0.35			
	Rural	13	160.12	1.46	153.22	1.43	-6.91	-0.90		2.14	2.05	4.19	0.54			
Informatic	City	2	166.63	4.33	155.83	4.71	-10.80	-0.22		18.74	22.14	40.88	0.82			
	Suburb	2	166.51	4.62	156.23	4.97	-10.28	-0.21		21.36	24.67	46.03	0.92			
	Town	1	158.57	4.13	‡	†				17.03						
	Rural	1	158.03	6.63	‡	†				43.94						

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students used the spell check function (collapsed) [WC30010], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	133	(1.4)	128	(1.3)
			Graduated high school	134	(1.0)	127	(1.1)
			education after high school	145	(1.1)	138	(1.6)
			Graduated college	143	(1.0)	137	(1.2)
			Unknown	123	(1.4)	115	(1.5)
		Not eligible	Did not finish high school	145	(2.5)	138	(3.7)
			Graduated high school	150	(1.3)	145	(2.4)
			education after high school	159	(1.3)	155	(1.9)
			Graduated college	168	(1.0)	161	(1.0)
			Unknown	137	(2.4)	132	(2.7)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	148	(5.1)	‡	†
			education after high school	159	(4.0)	‡	†
			Graduated college	169	(2.4)	162	(3.2)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-6.69	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.91	**-3.38**	**0.001**
Eligible	Did not finish high	6	132.99	1.39	128.35	1.29	-4.63	-0.28		1.94	1.66	3.60	0.22			
	Graduated high sc	10	133.70	0.97	127.08	1.08	-6.62	-0.66		0.94	1.18	2.12	0.21			
	Some education a	8	145.36	1.08	137.91	1.56	-7.45	-0.60		1.17	2.42	3.59	0.29			
	Graduated college	13	143.44	0.95	137.37	1.24	-6.07	-0.79		0.91	1.55	2.46	0.32			
	Unknown	6	123.07	1.40	114.65	1.48	-8.42	-0.51		1.95	2.20	4.15	0.25			
Not eligibl	Did not finish high	1	145.09	2.54	137.72	3.72	-7.38	-0.07		6.46	13.81	20.27	0.20			
	Graduated high sc	6	150.32	1.34	144.96	2.39	-5.37	-0.32		1.80	5.71	7.50	0.45			
	Some education a	7	158.84	1.32	154.67	1.89	-4.17	-0.29		1.75	3.56	5.31	0.37			
	Graduated college	36	168.49	0.98	160.69	1.01	-7.80	-2.81		0.95	1.01	1.97	0.71			
	Unknown	2	137.42	2.39	132.22	2.67	-5.19	-0.10		5.71	7.15	12.85	0.26			
Informatio	Did not finish high	0	‡	†	‡	†										
	Graduated high sc	0	147.54	5.13	‡	†				26.29						
	Some education a	1	158.63	3.98	‡	†				15.83						
	Graduated college	4	168.66	2.38	162.20	3.18	-6.45	-0.26		5.68	10.10	15.78	0.63			
	Unknown	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
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Average scale scores for writing, grade 8 by how often students used the spell check function (collapsed) [WC30010], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	144	(1.2)	139	(1.3)
			Black	128	(1.4)	122	(1.6)
			Hispanic	133	(0.9)	127	(0.9)
			Asian	152	(2.8)	145	(4.2)
			American Indian/Alaska Native	‡	†	‡	†
			Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	144	(1.9)	137	(2.2)
		Not eligible	White	166	(1.0)	159	(1.1)
			Black	147	(1.6)	139	(2.1)
			Hispanic	154	(1.2)	146	(1.3)
			Asian	176	(2.0)	167	(4.5)
			American Indian/Alaska Native	‡	†	‡	†
			Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	162	(1.9)	159	(2.4)
		Information not available	White	168	(2.4)	162	(3.8)
			Black	142	(5.1)	‡	†
			Hispanic	158	(3.7)	‡	†
			Asian	176	(5.2)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-6.18	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.05	**-3.07**	**0.002**
Eligible	White	13	144.47	1.15	138.69	1.32	-5.77	-0.75		1.33	1.74	3.08	0.40			
	Black	8	127.51	1.36	122.33	1.56	-5.17	-0.41		1.85	2.43	4.28	0.34			
	Hispanic	16	133.34	0.87	126.90	0.89	-6.44	-1.03		0.76	0.80	1.56	0.25			
	Asian	1	151.51	2.77	144.93	4.18	-6.58	-0.07		7.66	17.48	25.15	0.25			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	144.38	1.88	136.96	2.17	-7.42	-0.22		3.55	4.73	8.28	0.25			
Not eligibl	White	35	166.17	0.97	159.37	1.07	-6.80	-2.38		0.94	1.15	2.09	0.73			
	Black	3	146.80	1.57	139.41	2.14	-7.39	-0.22		2.47	4.57	7.04	0.21			
	Hispanic	8	153.75	1.20	145.74	1.31	-8.01	-0.64		1.44	1.72	3.16	0.25			
	Asian	2	176.15	2.03	167.17	4.51	-8.98	-0.18		4.11	20.36	24.47	0.49			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	161.73	1.86	158.76	2.40	-2.98	-0.09		3.45	5.74	9.19	0.28			
Informatio	White	3	168.10	2.43	161.77	3.75	-6.33	-0.19		5.92	14.07	20.00	0.60			
	Black	0	141.61	5.08	‡	†				25.79						
	Hispanic	1	157.93	3.74	‡	†				13.96						
	Asian	0	176.18	5.15	‡	†				26.57						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
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Average scale scores for writing, grade 8 by how often students used the spell check function (collapsed) [WC30010], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	131	(1.9)	126	(1.7)
			Graduated high school	135	(1.5)	127	(1.8)
			Some education after high school	147	(1.7)	140	(2.0)
			Graduated college	160	(1.4)	148	(1.8)
			Unknown	123	(2.0)	116	(2.0)
		Suburb	Did not finish high school	138	(2.3)	132	(2.5)
			Graduated high school	144	(1.6)	134	(1.9)
			Some education after high school	153	(1.7)	145	(1.8)
			Graduated college	168	(1.3)	159	(1.5)
			Unknown	132	(2.0)	123	(2.7)
		Town	Did not finish high school	136	(4.9)	‡	†
			Graduated high school	139	(2.5)	139	(3.2)
			Some education after high school	157	(1.8)	153	(4.3)
			Graduated college	158	(1.4)	152	(1.7)
			Unknown	125	(4.0)	118	(3.9)
		Rural	Did not finish high school	139	(3.2)	132	(3.6)
			Graduated high school	142	(2.0)	136	(2.6)
			Some education after high school	153	(2.2)	147	(1.8)
			Graduated college	160	(1.7)	153	(1.9)
			Unknown	130	(3.0)	121	(2.5)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-8.03	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.17	**-3.00**	**0.003**
City	Did not finish high	3	131.16	1.94	125.92	1.70	-5.24	-0.16		3.77	2.88	6.65	0.20			
	Graduated high sc	4	135.12	1.45	127.27	1.80	-7.85	-0.31		2.10	3.23	5.33	0.21			
	Some education af	4	147.42	1.70	140.37	2.01	-7.05	-0.28		2.90	4.04	6.93	0.28			
	Graduated college	13	160.10	1.39	148.32	1.80	-11.78	-1.53		1.92	3.23	5.14	0.67			
	Unknown	3	123.14	2.03	115.90	1.95	-7.24	-0.22		4.11	3.81	7.91	0.24			
Suburb	Did not finish high	2	137.57	2.32	131.99	2.49	-5.57	-0.11		5.36	6.22	11.58	0.23			
	Graduated high sc	5	144.18	1.56	134.30	1.87	-9.88	-0.49		2.43	3.51	5.94	0.30			
	Some education af	6	153.00	1.73	145.08	1.79	-7.92	-0.48		2.99	3.19	6.18	0.37			
	Graduated college	22	168.17	1.32	158.64	1.50	-9.53	-2.10		1.74	2.24	3.98	0.88			
	Unknown	3	131.89	2.04	122.89	2.73	-8.99	-0.27		4.18	7.46	11.64	0.35			
Town	Did not finish high	1	135.58	4.93	‡	†				24.26						
	Graduated high sc	2	138.71	2.54	139.01	3.25	0.30	0.01		6.44	10.54	16.98	0.34			
	Some education af	2	156.89	1.79	152.57	4.25	-4.33	-0.09		3.19	18.08	21.27	0.43			
	Graduated college	6	157.58	1.41	151.73	1.73	-5.85	-0.35		1.99	2.99	4.98	0.30			
	Unknown	1	124.53	3.98	117.69	3.87	-6.85	-0.07		15.83	15.00	30.83	0.31			
Rural	Did not finish high	1	138.81	3.22	132.36	3.58	-6.45	-0.06		10.36	12.85	23.21	0.23			
	Graduated high sc	4	141.68	2.02	135.76	2.60	-5.92	-0.24		4.07	6.74	10.81	0.43			
	Some education af	4	152.82	2.19	147.37	1.84	-5.44	-0.22		4.79	3.40	8.19	0.33			
	Graduated college	12	160.14	1.70	152.72	1.89	-7.42	-0.89		2.89	3.56	6.46	0.77			
	Unknown	2	129.84	3.03	121.24	2.51	-8.60	-0.17		9.20	6.30	15.50	0.31			

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Average scale scores for writing, grade 8 by how often students used the spell check function (collapsed) [WC30010], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	162	(1.5)	156	(2.0)
			Black	129	(2.3)	124	(1.8)
			Hispanic	139	(1.6)	129	(1.4)
			Asian	163	(2.8)	151	(4.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	152	(2.3)	143	(2.5)
		Suburb	White	167	(1.5)	158	(1.6)
			Black	138	(1.9)	129	(2.1)
			Hispanic	143	(1.5)	135	(1.5)
			Asian	176	(2.6)	166	(4.8)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	158	(2.2)	151	(3.7)
		Town	White	155	(1.3)	150	(1.9)
			Black	128	(4.9)	‡	†
			Hispanic	139	(2.4)	133	(2.8)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	153	(4.8)	‡	†
		Rural	White	157	(1.4)	149	(1.7)
			Black	136	(3.7)	130	(3.5)
			Hispanic	144	(1.9)	135	(2.0)
			Asian	175	(3.8)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	150	(2.9)	148	(4.0)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-7.64	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.55	-2.78	0.005
City	White	9	162.00	1.47	155.98	2.00	-6.01	-0.54		2.15	3.99	6.14	0.55			
	Black	5	129.20	2.26	124.31	1.80	-4.88	-0.24		5.11	3.23	8.34	0.42			
	Hispanic	10	138.50	1.56	129.10	1.41	-9.41	-0.94		2.45	1.98	4.43	0.44			
	Asian	2	163.23	2.81	150.99	4.90	-12.24	-0.24		7.88	24.04	31.91	0.64			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	2	152.12	2.27	142.60	2.53	-9.51	-0.19		5.17	6.41	11.58	0.23			
Suburb	White	20	167.00	1.48	158.49	1.60	-8.51	-1.70		2.18	2.56	4.74	0.95			
	Black	4	138.20	1.89	129.32	2.12	-8.88	-0.36		3.56	4.50	8.05	0.32			
	Hispanic	10	143.42	1.47	134.65	1.46	-8.76	-0.88		2.16	2.14	4.30	0.43			
	Asian	2	176.40	2.57	166.45	4.79	-9.94	-0.20		6.60	22.97	29.58	0.59			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	158.09	2.23	151.16	3.66	-6.93	-0.21		4.99	13.37	18.36	0.55			
Town	White	8	155.10	1.31	149.77	1.90	-5.33	-0.43		1.71	3.60	5.31	0.42			
	Black	1	127.66	4.95	‡	†				24.49						
	Hispanic	2	139.42	2.42	132.86	2.75	-6.56	-0.13		5.86	7.58	13.44	0.27			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	152.51	4.85	‡	†				23.49						
Rural	White	15	156.65	1.42	148.70	1.73	-7.94	-1.19		2.02	2.98	5.00	0.75			
	Black	2	135.57	3.75	129.59	3.46	-5.98	-0.12		14.06	11.97	26.03	0.52			
	Hispanic	3	143.74	1.86	135.50	1.95	-8.24	-0.25		3.46	3.80	7.26	0.22			
	Asian	0	175.14	3.85	‡	†				14.81						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	150.26	2.91	148.33	3.97	-1.92	-0.02		8.50	15.80	24.30	0.24			

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Average scale scores for writing, grade 8 by how often students used the spell check function (collapsed) [WC30010], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	141	(2.9)	135	(3.1)
			Black	118	(3.7)	114	(3.7)
			Hispanic	134	(1.5)	129	(1.4)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	148	(1.3)	142	(2.3)
			Black	125	(2.1)	120	(2.1)
			Hispanic	136	(1.3)	129	(2.1)
			Asian	154	(7.7)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	141	(3.8)	140	(3.0)
		Some education after high school	White	158	(1.3)	153	(1.5)
			Black	138	(2.2)	134	(2.3)
			Hispanic	147	(1.5)	140	(2.2)
			Asian	166	(4.1)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	153	(2.4)	145	(4.7)
		Graduated college	White	168	(1.0)	161	(1.0)
			Black	141	(1.6)	133	(1.9)
			Hispanic	154	(1.2)	143	(1.4)
			Asian	175	(1.6)	166	(3.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	160	(1.9)	155	(2.1)
		Unknown	White	135	(2.2)	124	(2.6)
			Black	115	(3.3)	114	(4.2)
			Hispanic	122	(1.7)	116	(1.4)
			Asian	151	(5.6)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-6.64	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.02	-2.71	0.007
Did not fin	White	2	141.02	2.90	135.33	3.09	-5.69	-0.11		8.41	9.55	17.96	0.36			
	Black	1	118.17	3.70	113.66	3.70	-4.51	-0.05		13.71	13.72	27.43	0.27			
	Hispanic	4	133.58	1.48	129.41	1.35	-4.17	-0.17		2.19	1.83	4.02	0.16			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										
Graduated	White	7	147.57	1.33	141.68	2.28	-5.89	-0.41		1.78	5.22	6.99	0.49			
	Black	2	124.77	2.12	119.78	2.14	-5.00	-0.10		4.50	4.56	9.07	0.18			
	Hispanic	5	135.51	1.28	129.43	2.07	-6.08	-0.30		1.63	4.30	5.93	0.30			
	Asian	0	154.00	7.74	‡	†				59.89						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	140.79	3.77	139.85	2.99	-0.93	-0.01		14.18	8.95	23.13	0.23			
Some edu	White	7	157.90	1.31	152.75	1.54	-5.15	-0.36		1.72	2.37	4.09	0.29			
	Black	2	138.28	2.18	134.15	2.34	-4.13	-0.08		4.77	5.49	10.26	0.21			
	Hispanic	4	147.35	1.49	139.63	2.17	-7.72	-0.31		2.21	4.70	6.91	0.28			
	Asian	0	166.13	4.07	‡	†				16.53						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	152.65	2.44	145.34	4.74	-7.32	-0.07		5.97	22.44	28.41	0.28			
Graduated	White	33	168.10	1.00	161.03	1.01	-7.07	-2.33		1.00	1.02	2.01	0.66			
	Black	5	141.03	1.58	133.08	1.91	-7.96	-0.40		2.50	3.65	6.15	0.31			
	Hispanic	8	153.78	1.22	143.31	1.45	-10.47	-0.84		1.49	2.10	3.59	0.29			
	Asian	3	174.98	1.64	165.67	3.92	-9.31	-0.28		2.70	15.38	18.07	0.54			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	4	160.25	1.94	154.62	2.14	-5.63	-0.23		3.77	4.59	8.36	0.33			
Unknown	White	3	134.70	2.20	124.11	2.63	-10.59	-0.32		4.86	6.92	11.77	0.35			
	Black	1	114.96	3.24	113.69	4.19	-1.28	-0.01		10.49	17.55	28.04	0.28			
	Hispanic	4	122.10	1.73	115.57	1.43	-6.53	-0.26		3.00	2.04	5.04	0.20			
	Asian	0	151.46	5.65	‡	†				31.89						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										

Appendix C.5

Thesaurus Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students accessed the thesaurus (collapsed) [WC300141], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	low use (collapsed)		high use (collapsed)	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	124	(0.7)	133	(1.7)
			Not eligible	150	(0.9)	164	(1.3)
			Information not available	153	(2.7)	164	(5.3)
		Female	Eligible	143	(0.7)	156	(1.3)
			Not eligible	169	(0.8)	182	(1.4)
			Information not available	168	(2.5)	186	(3.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*p*	*t-test statistic*
Gender	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	12.67	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.14	0.000	6.23
Male	Eligible	21	124.11	0.69	133.23	1.72	9.11	1.91		0.47	2.97	3.44	0.72			
	Not eligible	27	149.73	0.90	163.85	1.31	14.13	3.81		0.80	1.71	2.51	0.68			
	Information not av	3	152.94	2.66	164.35	5.29	11.41	0.34		7.08	27.99	35.07	1.05			
Female	Eligible	21	142.64	0.66	156.11	1.32	13.47	2.83		0.44	1.75	2.18	0.46			
	Not eligible	26	169.46	0.85	181.90	1.39	12.44	3.23		0.72	1.93	2.65	0.69			
	Information not av	3	167.77	2.49	185.50	3.42	17.73	0.53		6.21	11.69	17.90	0.54			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students accessed the thesaurus (collapsed) [WC30014], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	133	(1.3)	150	(2.4)
			Suburb	144	(1.3)	159	(2.0)
			Town	137	(1.9)	148	(3.7)
			Rural	139	(1.4)	153	(2.8)
		Female	City	151	(1.3)	168	(2.0)
			Suburb	162	(1.3)	180	(1.7)
			Town	157	(1.4)	174	(2.5)
			Rural	159	(1.4)	170	(2.6)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	15.51	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.43	**5.69**	**0.000**
Male	City	14	133.19	1.29	149.83	2.44	16.64	2.33		1.67	5.95	7.62	1.07			
	Suburb	19	143.97	1.28	158.72	1.95	14.75	2.80		1.64	3.82	5.45	1.04			
	Town	6	137.34	1.86	147.64	3.66	10.30	0.62		3.45	13.43	16.88	1.01			
	Rural	12	138.58	1.40	152.61	2.82	14.03	1.68		1.97	7.93	9.90	1.19			
Female	City	14	150.58	1.28	167.73	1.96	17.15	2.40		1.64	3.83	5.46	0.76			
	Suburb	19	162.24	1.33	180.02	1.72	17.77	3.38		1.76	2.95	4.71	0.90			
	Town	6	156.70	1.36	173.52	2.49	16.82	1.01		1.84	6.21	8.05	0.48			
	Rural	11	158.59	1.44	170.33	2.62	11.75	1.29		2.08	6.85	8.92	0.98			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students accessed the thesaurus (collapsed) [WC30014], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	123	(1.1)	128	(3.8)
			Graduated high school	128	(1.1)	136	(2.3)
			Some education after high school	138	(1.0)	146	(2.3)
			Graduated college	150	(0.9)	164	(1.5)
			Unknown	115	(1.2)	121	(3.9)
		Female	Did not finish high school	140	(1.2)	151	(4.0)
			Graduated high school	146	(1.0)	160	(2.4)
			Some education after high school	159	(1.1)	170	(2.0)
			Graduated college	168	(0.8)	182	(1.2)
			Unknown	134	(1.2)	149	(3.8)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	12.16	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.91	**5.00**	**0.000**
Male	Did not finish high	3	122.66	1.11	127.51	3.77	4.85	0.15		1.23	14.21	15.44	0.46			
	Graduated high sc	8	127.68	1.15	135.88	2.33	8.20	0.66		1.31	5.41	6.72	0.54			
	Some education af	7	137.57	1.05	145.53	2.32	7.96	0.56		1.10	5.38	6.48	0.45			
	Graduated college	27	149.52	0.86	164.17	1.45	14.65	3.96		0.75	2.11	2.86	0.77			
	Unknown	5	115.11	1.15	121.25	3.92	6.14	0.31		1.33	15.33	16.66	0.83			
Female	Did not finish high	4	140.16	1.22	151.33	3.95	11.17	0.45		1.49	15.63	17.12	0.68			
	Graduated high sc	8	146.46	1.00	160.20	2.40	13.73	1.10		1.01	5.78	6.79	0.54			
	Some education af	8	158.98	1.06	169.87	2.04	10.90	0.87		1.13	4.17	5.31	0.42			
	Graduated college	26	168.17	0.83	181.60	1.23	13.43	3.49		0.69	1.51	2.20	0.57			
	Unknown	4	133.56	1.22	149.44	3.76	15.88	0.64		1.50	14.16	15.65	0.63			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students accessed the thesaurus (collapsed) [WC30014], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	148	(1.0)	162	(1.5)
			Black	122	(1.2)	132	(3.1)
			Hispanic	128	(0.8)	138	(2.0)
			Asian	156	(2.6)	170	(4.5)
			American Indian/Alaska Native	124	(3.6)	‡	†
			Native Hawaiian/Other Pacific Islander	121	(4.7)	‡	†
			Two or more races	140	(1.5)	153	(3.7)
		Female	White	167	(0.8)	181	(1.5)
			Black	138	(1.5)	155	(2.4)
			Hispanic	145	(0.8)	162	(1.9)
			Asian	173	(2.0)	185	(3.1)
			American Indian/Alaska Native	141	(4.4)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	159	(1.4)	174	(2.4)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	13.34	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.26	**5.82**	**0.000**
Male	White	26	147.82	0.96	161.63	1.49	13.81	3.59		0.91	2.21	3.12	0.81			
	Black	6	122.15	1.19	132.37	3.05	10.22	0.61		1.42	9.30	10.72	0.64			
	Hispanic	13	127.79	0.82	137.76	1.97	9.97	1.30		0.67	3.87	4.55	0.59			
	Asian	2	155.79	2.55	170.03	4.50	14.24	0.28		6.52	20.22	26.73	0.53			
	American Indian/A	0	123.58	3.62	‡	†				13.10						
	Native Hawaiian/C	0	120.57	4.73	‡	†				22.39						
	Two or more races	3	139.96	1.49	152.73	3.71	12.77	0.38		2.23	13.78	16.01	0.48			
Female	White	25	167.24	0.79	181.14	1.51	13.90	3.48		0.63	2.29	2.92	0.73			
	Black	6	137.72	1.53	154.54	2.36	16.83	1.01		2.35	5.57	7.92	0.48			
	Hispanic	12	145.49	0.76	162.04	1.86	16.55	1.99		0.58	3.46	4.04	0.49			
	Asian	2	172.60	2.02	185.07	3.08	12.47	0.25		4.07	9.47	13.55	0.27			
	American Indian/A	0	141.19	4.40	‡	†				19.40						
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	3	159.39	1.38	174.37	2.43	14.98	0.45		1.90	5.88	7.78	0.23			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students accessed the thesaurus (collapsed) [WC30014], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	129	(1.0)	140	(2.0)
			Suburb	135	(1.0)	152	(1.9)
			Town	136	(1.4)	150	(3.9)
			Rural	136	(1.5)	145	(2.5)
		Not eligible	City	157	(1.4)	173	(1.9)
			Suburb	163	(1.4)	178	(1.8)
			Town	154	(1.4)	170	(2.9)
			Rural	156	(1.3)	171	(2.4)
		Information not available	City	161	(4.4)	179	(4.2)
			Suburb	161	(4.1)	183	(6.3)
			Town	154	(3.3)	‡	†
			Rural	156	(5.3)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	13.97	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.14	4.90	0.000
Eligible	City	15	128.70	1.00	139.94	1.99	11.24	1.69		0.99	3.97	4.96	0.74			
	Suburb	13	135.03	1.01	152.21	1.89	17.18	2.23		1.03	3.56	4.59	0.60			
	Town	5	136.22	1.38	149.57	3.88	13.35	0.67		1.90	15.09	16.98	0.85			
	Rural	9	136.33	1.51	145.18	2.54	8.85	0.80		2.27	6.45	8.72	0.79			
Not eligibl	City	10	157.37	1.44	173.28	1.95	15.90	1.59		2.06	3.80	5.87	0.59			
	Suburb	23	163.02	1.37	177.69	1.76	14.68	3.38		1.87	3.08	4.95	1.14			
	Town	6	154.33	1.35	169.67	2.94	15.34	0.92		1.83	8.64	10.47	0.63			
	Rural	13	156.16	1.25	170.91	2.39	14.75	1.92		1.57	5.70	7.27	0.95			
Informatio	City	2	161.42	4.40	178.72	4.23	17.30	0.35		19.40	17.89	37.29	0.75			
	Suburb	2	161.24	4.05	183.34	6.27	22.10	0.44		16.42	39.31	55.73	1.11			
	Town	1	154.01	3.30	‡	†				10.86						
	Rural	1	155.60	5.33	‡	†				28.36						

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students accessed the thesaurus (collapsed) [WC30014], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	131	(1.1)	137	(3.2)
			Graduated high school	130	(0.8)	143	(2.5)
			Some education after high school	141	(1.0)	151	(2.5)
			Graduated college	140	(0.9)	153	(2.1)
			Unknown	119	(1.1)	128	(3.1)
		Not eligible	Did not finish high school	141	(2.1)	‡	†
			Graduated high school	147	(1.4)	160	(2.5)
			Some education after high school	156	(1.3)	168	(2.7)
			Graduated college	164	(0.9)	178	(1.3)
			Unknown	134	(1.9)	‡	†
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	145	(4.6)	‡	†
			Some education after high school	153	(4.1)	‡	†
			Graduated college	165	(2.2)	180	(3.5)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	11.94	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.02	**4.87**	**0.000**
Eligible	Did not finish high	6	130.64	1.06	137.14	3.24	6.50	0.39		1.12	10.53	11.64	0.70			
	Graduated high sc	10	130.13	0.83	143.49	2.53	13.36	1.34		0.69	6.40	7.09	0.71			
	Some education af	8	141.42	0.95	151.16	2.49	9.74	0.78		0.90	6.20	7.11	0.57			
	Graduated college	13	139.87	0.85	153.39	2.13	13.52	1.76		0.73	4.52	5.24	0.68			
	Unknown	6	118.98	1.06	127.77	3.09	8.79	0.53		1.12	9.58	10.69	0.64			
Not eligibl	Did not finish high	1	140.93	2.09	‡	†				4.35						
	Graduated high sc	6	147.44	1.41	159.75	2.55	12.32	0.74		1.99	6.49	8.48	0.51			
	Some education af	7	155.97	1.29	168.17	2.74	12.19	0.85		1.66	7.53	9.18	0.64			
	Graduated college	36	164.34	0.89	178.05	1.28	13.71	4.93		0.79	1.64	2.43	0.87			
	Unknown	2	134.44	1.93	‡	†				3.74						
Informatio	Did not finish high	0	‡	†	‡	†										
	Graduated high sc	0	145.21	4.62	‡	†				21.31						
	Some education af	1	153.40	4.09	‡	†				16.72						
	Graduated college	4	164.69	2.23	180.35	3.52	15.65	0.63		4.98	12.41	17.39	0.70			
	Unknown	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students accessed the thesaurus (collapsed) [WC30014], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	141	(0.9)	155	(2.1)
			Black	124	(1.2)	137	(2.3)
			Hispanic	130	(0.7)	140	(1.8)
			Asian	147	(2.9)	‡	†
			American Indian/Alaska Native	122	(4.4)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	140	(1.6)	152	(3.9)
		Not eligible	White	162	(0.9)	176	(1.4)
			Black	142	(1.3)	158	(3.5)
			Hispanic	149	(1.0)	166	(2.2)
			Asian	172	(2.2)	185	(2.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	158	(1.6)	175	(3.2)
		Information not available	White	165	(2.3)	178	(3.9)
			Black	139	(3.8)	‡	†
			Hispanic	151	(3.4)	‡	†
			Asian	170	(4.8)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	12.59	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.41	**5.41**	**0.000**
Eligible	White	13	141.32	0.93	154.53	2.11	13.20	1.72		0.87	4.43	5.31	0.69			
	Black	8	124.17	1.20	137.38	2.28	13.21	1.06		1.43	5.19	6.62	0.53			
	Hispanic	16	129.87	0.72	139.98	1.78	10.11	1.62		0.52	3.16	3.68	0.59			
	Asian	1	147.31	2.90	‡	†				8.41						
	American Indian/A	0	121.93	4.44	‡	†				19.67						
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	140.24	1.55	152.46	3.85	12.22	0.37		2.40	14.85	17.25	0.52			
Not eligible	White	35	162.40	0.88	176.36	1.40	13.96	4.89		0.78	1.96	2.74	0.96			
	Black	3	142.21	1.29	158.14	3.54	15.92	0.48		1.67	12.51	14.18	0.43			
	Hispanic	8	149.16	1.00	165.55	2.20	16.40	1.31		0.99	4.84	5.83	0.47			
	Asian	2	172.15	2.17	185.13	2.53	12.97	0.26		4.73	6.41	11.14	0.22			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	158.14	1.60	174.97	3.19	16.83	0.50		2.57	10.16	12.73	0.38			
Informatio	White	3	164.63	2.30	177.71	3.94	13.08	0.39		5.27	15.55	20.81	0.62			
	Black	0	139.41	3.77	‡	†				14.21						
	Hispanic	1	151.00	3.44	‡	†				11.83						
	Asian	0	170.34	4.83	‡	†				23.35						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students accessed the thesaurus (collapsed) [WC30014], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	128	(1.4)	137	(4.4)
			Graduated high school	131	(1.3)	144	(3.1)
			Some education after high school	143	(1.4)	154	(3.1)
			Graduated college	154	(1.3)	170	(2.1)
			Unknown	119	(1.5)	132	(5.7)
		Suburb	Did not finish high school	134	(1.6)	‡	†
			Graduated high school	139	(1.4)	157	(3.1)
			Some education after high school	149	(1.7)	163	(2.3)
			Graduated college	163	(1.3)	179	(1.7)
			Unknown	127	(1.8)	‡	†
		Town	Did not finish high school	134	(4.8)	‡	†
			Graduated high school	138	(2.3)	‡	†
			Some education after high school	154	(1.6)	‡	†
			Graduated college	154	(1.2)	170	(2.2)
			Unknown	122	(3.2)	‡	†
		Rural	Did not finish high school	136	(2.9)	‡	†
			Graduated high school	138	(1.9)	150	(4.2)
			Some education after high school	150	(1.7)	155	(3.8)
			Graduated college	156	(1.5)	171	(2.8)
			Unknown	126	(2.2)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	12.38	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.57	**4.23**	**0.000**
City	Did not finish high	3	128.17	1.45	137.45	4.41	9.28	0.28		2.09	19.47	21.57	0.65			
	Graduated high sc	4	131.26	1.27	143.87	3.08	12.61	0.50		1.62	9.50	11.12	0.44			
	Some education af	4	143.25	1.41	153.74	3.09	10.50	0.42		2.00	9.58	11.58	0.46			
	Graduated college	13	153.97	1.35	170.38	2.09	16.40	2.13		1.82	4.37	6.19	0.81			
	Unknown	3	119.06	1.52	131.63	5.69	12.57	0.38		2.30	32.36	34.66	1.04			
Suburb	Did not finish high	2	134.50	1.58	‡	†				2.49						
	Graduated high sc	5	139.33	1.40	156.64	3.10	17.31	0.87		1.96	9.62	11.58	0.58			
	Some education af	6	148.70	1.68	163.39	2.32	14.69	0.88		2.82	5.39	8.21	0.49			
	Graduated college	22	163.39	1.28	179.28	1.73	15.90	3.50		1.65	2.98	4.62	1.02			
	Unknown	3	127.45	1.85	‡	†				3.42						
Town	Did not finish high	1	133.62	4.82	‡	†				23.21						
	Graduated high sc	2	138.34	2.31	‡	†				5.34						
	Some education af	2	153.91	1.58	‡	†				2.49						
	Graduated college	6	153.92	1.17	169.88	2.23	15.96	0.96		1.37	4.97	6.34	0.38			
	Unknown	1	121.53	3.20	‡	†				10.24						
Rural	Did not finish high	1	136.02	2.88	‡	†				8.29						
	Graduated high sc	4	138.22	1.92	150.44	4.20	12.22	0.49		3.69	17.66	21.34	0.85			
	Some education af	4	150.37	1.66	154.83	3.76	4.46	0.18		2.75	14.12	16.87	0.67			
	Graduated college	12	155.89	1.48	170.91	2.75	15.03	1.80		2.18	7.57	9.75	1.17			
	Unknown	2	125.81	2.23	‡	†				4.99						

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students accessed the thesaurus (collapsed) [WC30014], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	158	(1,5)	174	(2,2)
			Black	126	(1,7)	138	(3,8)
			Hispanic	133	(1,3)	147	(2,7)
			Asian	158	(2,7)	175	(3,2)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	146	(1,9)	165	(4,3)
		Suburb	White	163	(1,4)	177	(1,8)
			Black	133	(1,6)	155	(3,6)
			Hispanic	139	(1,2)	157	(2,8)
			Asian	172	(2,6)	185	(3,6)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	153	(2,2)	170	(3,8)
		Town	White	152	(1,2)	169	(3,2)
			Black	127	(3,9)	‡	†
			Hispanic	136	(1,7)	‡	†
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(3,3)	‡	†
		Rural	White	152	(1,3)	167	(2,6)
			Black	132	(3,6)	‡	†
			Hispanic	139	(1,6)	152	(3,2)
			Asian	173	(3,6)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	148	(2,4)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	14.38	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	9.37	4.70	0.000
City	White	9	158.04	1.53	173.94	2.17	15.89	1.43		2.34	4.71	7.05	0.63			
	Black	5	125.79	1.75	138.04	3.78	12.25	0.61		3.05	14.32	17.37	0.87			
	Hispanic	10	133.46	1.26	146.77	2.74	13.31	1.33		1.59	7.51	9.11	0.91			
	Asian	2	157.77	2.66	175.43	3.19	17.67	0.35		7.08	10.16	17.24	0.34			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	2	146.18	1.87	165.16	4.32	18.98	0.38		3.48	18.69	22.17	0.44			
Suburb	White	20	162.87	1.41	177.10	1.78	14.23	2.85		1.99	3.17	5.16	1.03			
	Black	4	133.05	1.61	155.12	3.62	22.07	0.88		2.60	13.12	15.73	0.63			
	Hispanic	10	138.65	1.16	156.62	2.78	17.97	1.80		1.36	7.75	9.10	0.91			
	Asian	2	171.97	2.57	184.54	3.63	12.57	0.25		6.60	13.17	19.77	0.40			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	153.26	2.18	169.90	3.83	16.64	0.50		4.77	14.66	19.44	0.58			
Town	White	8	151.66	1.24	169.07	3.22	17.41	1.39		1.53	10.39	11.91	0.95			
	Black	1	127.22	3.95	‡	†				15.59						
	Hispanic	2	135.88	1.68	‡	†				2.81						
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	149.21	3.28	‡	†				10.79						
Rural	White	15	152.34	1.31	167.10	2.61	14.75	2.21		1.70	6.79	8.50	1.27			
	Black	2	131.92	3.57	‡	†				12.74						
	Hispanic	3	139.05	1.63	152.14	3.23	13.08	0.39		2.67	10.46	13.14	0.39			
	Asian	0	172.78	3.62	‡	†				13.07						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	147.84	2.42	‡	†				5.85						

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer: http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by how often students accessed the thesaurus (collapsed) [WC30014], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	138	(2.1)	‡	†
			Black	115	(2.7)	‡	†
			Hispanic	131	(1.0)	137	(3.4)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	145	(1.3)	156	(2.9)
			Black	122	(1.8)	‡	†
			Hispanic	132	(1.2)	143	(3.5)
			Asian	147	(7.4)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	139	(2.6)	‡	†
		Some education after high school	White	155	(1.1)	168	(2.3)
			Black	136	(1.9)	141	(3.8)
			Hispanic	144	(1.3)	151	(3.9)
			Asian	165	(4.1)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(2.5)	‡	†
		Graduated college	White	164	(0.9)	177	(1.4)
			Black	136	(1.4)	154	(2.5)
			Hispanic	148	(1.1)	167	(2.8)
			Asian	171	(1.7)	184	(2.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	156	(1.5)	173	(3.1)
		Unknown	White	131	(1.9)	‡	†
			Black	113	(2.4)	‡	†
			Hispanic	119	(1.2)	128	(4.3)
			Asian	148	(4.4)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	128	(3.5)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	11.07	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.98	4.19	0.000
Did not fin	White	2	138.31	2.13	‡	†				4.54						
	Black	1	115.00	2.74	‡	†				7.48						
	Hispanic	4	131.47	1.05	136.83	3.37	5.36	0.21		1.10	11.37	12.47	0.50			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										
Graduated	White	7	144.69	1.32	155.68	2.86	10.98	0.77		1.75	8.19	9.94	0.70			
	Black	2	121.53	1.81	‡	†				3.26						
	Hispanic	5	132.28	1.25	143.06	3.54	10.78	0.54		1.56	12.56	14.12	0.71			
	Asian	0	147.30	7.36	‡	†				54.23						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	138.95	2.65	‡	†				7.01						
Some edu	White	7	154.68	1.11	168.44	2.27	13.76	0.96		1.24	5.16	6.40	0.45			
	Black	2	135.92	1.93	141.28	3.80	5.35	0.11		3.72	14.46	18.18	0.36			
	Hispanic	4	143.56	1.25	151.25	3.89	7.69	0.31		1.57	15.11	16.68	0.67			
	Asian	0	164.91	4.08	‡	†				16.69						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	148.89	2.47	‡	†				6.12						
Graduated	White	33	164.30	0.88	177.28	1.39	12.99	4.29		0.77	1.93	2.70	0.89			
	Black	5	136.09	1.36	154.01	2.52	17.92	0.90		1.85	6.37	8.22	0.41			
	Hispanic	8	148.08	1.07	167.26	2.84	19.18	1.53		1.14	8.09	9.23	0.74			
	Asian	3	170.91	1.74	183.69	2.50	12.77	0.38		3.04	6.27	9.31	0.28			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	4	155.96	1.46	173.37	3.13	17.42	0.70		2.13	9.79	11.92	0.48			
Unknown	White	3	130.73	1.88	‡	†				3.52						
	Black	1	112.66	2.38	‡	†				5.69						
	Hispanic	4	118.64	1.18	128.06	4.32	9.42	0.38		1.38	18.66	20.05	0.80			
	Asian	0	148.00	4.42	‡	†				19.50						
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	128.21	3.50	‡	†				12.28						

Appendix C.6

Availability of Computers Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer: http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by availability of computers for writing instruction (collapsed) [T117401], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	low use (collapsed)		high use (collapsed)	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	125	(1.1)	125	(0.9)
			Not eligible	151	(1.0)	152	(1.2)
			Information not available	150	(4.1)	158	(3.7)
		Female	Eligible	144	(1.0)	145	(0.9)
			Not eligible	170	(0.9)	173	(1.0)
			Information not available	163	(3.8)	177	(3.8)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR					VARIANCE OF EFFECT	*test statistic*	*p*
	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	1.71	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.80	**0.88**	**0.381**
Gender	Eligible	21	125.22	1.10	124.66	0.93	-0.55	-0.12		1.21	0.87	2.08	0.44			
	Not eligible	27	150.73	1.01	151.65	1.21	0.93	0.25		1.02	1.48	2.50	0.67			
	Information not available	3	149.93	4.10	157.70	3.70	7.77	0.23		16.82	13.69	30.50	0.92			
Female	Eligible	21	143.94	1.03	144.67	0.89	0.73	0.15		1.05	0.79	1.84	0.39			
	Not eligible	26	169.74	0.95	172.71	1.04	2.97	0.77		0.90	1.09	1.99	0.52			
	Information not available	3	162.82	3.84	176.71	3.79	13.89	0.42		14.74	14.39	29.13	0.87			

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Average scale scores for writing, grade 8 by availability of computers for writing instruction (collapsed) [T117401], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	134	(1.7)	137	(2.0)
			Suburb	144	(1.6)	147	(1.6)
			Town	136	(1.8)	139	(2.9)
			Rural	141	(2.2)	140	(1.7)
		Female	City	152	(1.8)	154	(1.9)
			Suburb	162	(1.7)	167	(1.4)
			Town	157	(2.5)	161	(2.0)
			Rural	160	(1.8)	161	(2.0)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	2.74	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.82	**1.05**	**0.294**
Male	City	14	133.90	1.71	136.60	1.95	2.70	0.38		2.94	3.82	6.76	0.95			
	Suburb	19	143.79	1.64	146.55	1.65	2.77	0.53		2.71	2.72	5.42	1.03			
	Town	6	135.82	1.83	139.25	2.85	3.43	0.21		3.36	8.12	11.49	0.69			
	Rural	12	140.51	2.16	140.29	1.68	-0.22	-0.03		4.66	2.83	7.49	0.90			
Female	City	14	151.56	1.77	154.25	1.88	2.69	0.38		3.12	3.55	6.67	0.93			
	Suburb	19	162.04	1.70	167.11	1.45	5.07	0.96		2.88	2.10	4.97	0.95			
	Town	6	157.14	2.48	160.66	1.99	3.52	0.21		6.14	3.97	10.11	0.61			
	Rural	11	159.84	1.77	160.80	1.97	0.96	0.11		3.14	3.88	7.02	0.77			

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Average scale scores for writing, grade 8 by availability of computers for writing instruction (collapsed) [T117401], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	124	(1.6)	123	(1.8)
			Graduated high school	128	(1.4)	129	(1.5)
			Some education after high school	139	(1.2)	138	(1.2)
			Graduated college	150	(1.1)	152	(1.2)
			Unknown	114	(1.6)	117	(1.5)
		Female	Did not finish high school	143	(1.9)	140	(1.9)
			Graduated high school	148	(1.5)	148	(1.2)
			Some education after high school	159	(1.4)	161	(1.3)
			Graduated college	168	(0.9)	172	(1.0)
			Unknown	134	(1.7)	136	(1.8)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	1.87	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	2.08	**1.30**	**0.195**
Male	Did no	0	123.60	1.64	123.41	1.80	-0.20	0.00		2.70	3.23	5.93	0.00			
	Gradu	8	127.77	1.40	129.10	1.53	1.34	0.11		1.96	2.34	4.30	0.34			
	Some	7	138.90	1.25	138.09	1.24	-0.81	-0.06		1.56	1.55	3.11	0.22			
	Gradu	27	149.95	1.14	151.98	1.19	2.03	0.55		1.30	1.41	2.71	0.73			
	Unkno	0	114.06	1.65	117.06	1.49	3.01	0.00		2.72	2.21	4.93	0.00			
Female	Did no	0	142.69	1.87	139.82	1.90	-2.87	0.00		3.50	3.63	7.13	0.00			
	Gradu	0	147.78	1.50	148.46	1.19	0.68	0.00		2.24	1.41	3.64	0.00			
	Some	8	159.49	1.39	161.42	1.28	1.93	0.15		1.94	1.64	3.58	0.29			
	Gradu	26	167.98	0.94	172.27	1.01	4.29	1.12		0.89	1.03	1.92	0.50			
	Unkno	0	133.82	1.72	136.36	1.82	2.55	0.00		2.95	3.31	6.27	0.00			

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Average scale scores for writing, grade 8 by availability of computers for writing instruction (collapsed) [T117401], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	149	(1.1)	149	(1.3)
			Black	123	(1.5)	123	(1.8)
			Hispanic	127	(1.4)	130	(1.0)
			Asian	162	(2.4)	154	(3.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	138	(2.2)	144	(2.0)
		Female	White	168	(1.0)	170	(1.1)
			Black	140	(1.6)	141	(2.1)
			Hispanic	147	(1.1)	148	(1.0)
			Asian	176	(2.3)	174	(2.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	162	(2.2)	162	(1.9)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	1.34	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.93	**0.68**	**0.499**
Male	White	26	148.99	1.14	149.34	1.33	0.36	0.09		1.30	1.78	3.07	0.80			
	Black	6	123.35	1.52	123.41	1.76	0.06	0.00		2.32	3.10	5.42	0.33			
	Hispan	13	127.47	1.35	129.92	0.99	2.46	0.32		1.83	0.99	2.82	0.37			
	Asian	2	161.54	2.44	154.40	3.85	-7.14	-0.14		5.94	14.86	20.80	0.42			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	138.45	2.21	144.10	1.98	5.65	0.17		4.87	3.92	8.78	0.26			
Female	White	25	167.72	1.01	170.22	1.09	2.50	0.62		1.02	1.19	2.21	0.55			
	Black	6	139.63	1.62	141.00	2.07	1.37	0.08		2.63	4.29	6.92	0.42			
	Hispan	12	146.52	1.09	148.29	1.04	1.77	0.21		1.18	1.08	2.26	0.27			
	Asian	2	175.90	2.27	173.61	2.89	-2.28	-0.05		5.15	8.38	13.53	0.27			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	161.54	2.15	162.30	1.94	0.76	0.02		4.62	3.75	8.37	0.25			

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Average scale scores for writing, grade 8 by availability of computers for writing instruction (collapsed) [T117401], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	131	(1.6)	129	(1.4)
			Suburb	136	(1.6)	138	(1.1)
			Town	135	(2.1)	138	(2.1)
			Rural	137	(2.0)	137	(1.7)
		Not eligible	City	158	(1.5)	160	(1.9)
			Suburb	164	(1.5)	165	(1.6)
			Town	156	(1.9)	157	(2.0)
			Rural	158	(1.9)	159	(1.6)
		Information not available	City	157	(5.8)	169	(5.1)
			Suburb	157	(8.1)	166	(5.4)
			Town	152	(7.7)	‡	†
			Rural	‡	†	152	(4.4)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	1.10	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.27	**0.38**	**0.702**
Eligible	City	15	131.49	1.64	128.72	1.44	-2.78	-0.42		2.69	2.07	4.76	0.71			
	Suburb	13	136.03	1.56	137.77	1.10	1.74	0.23		2.43	1.20	3.64	0.47			
	Town	5	135.38	2.13	138.05	2.07	2.67	0.13		4.53	4.30	8.83	0.44			
	Rural	9	137.35	2.02	137.12	1.66	-0.23	-0.02		4.09	2.77	6.86	0.62			
Not eligible	City	10	157.71	1.53	160.37	1.87	2.66	0.27		2.34	3.48	5.82	0.58			
	Suburb	23	163.91	1.46	165.42	1.64	1.52	0.35		2.13	2.69	4.81	1.11			
	Town	6	155.51	1.93	157.26	1.97	1.75	0.11		3.74	3.86	7.61	0.46			
	Rural	13	158.25	1.86	158.56	1.63	0.31	0.04		3.46	2.65	6.11	0.79			
Information not av	City	2	157.22	5.77	169.12	5.11	11.90	0.24		33.26	26.12	59.38	1.19			
	Suburb	2	157.25	8.09	166.23	5.44	8.97	0.18		65.42	29.58	95.00	1.90			
	Town	1	152.02	7.74	‡	†				59.86						
	Rural	1	‡	†	151.74	4.42					19.50					

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Average scale scores for writing, grade 8 by availability of computers for writing instruction (collapsed) [T117401], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	133	(1.4)	130	(1.5)
			Graduated high school	130	(1.3)	132	(1.2)
			Some education after high school	143	(1.1)	143	(1.2)
			Graduated college	142	(1.3)	141	(1.2)
			Unknown	119	(1.5)	121	(1.6)
		Not eligible	Did not finish high school	143	(2.6)	143	(3.2)
			Graduated high school	150	(1.6)	147	(1.9)
			Some education after high school	157	(1.6)	158	(1.5)
			Graduated college	165	(1.0)	167	(1.1)
			Unknown	136	(2.9)	136	(2.3)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	‡	†	‡	†
			Some education after high school	‡	†	‡	†
			Graduated college	162	(3.5)	169	(3.4)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	0.94	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.32	**0.45**	**0.650**
Eligible	Did not finish	6	132.59	1.38	130.09	1.51	-2.50	-0.15		1.90	2.29	4.18	0.25			
	Graduated hig	10	130.46	1.28	132.44	1.20	1.98	0.20		1.63	1.43	3.06	0.31			
	Some educati	8	143.07	1.05	142.57	1.18	-0.50	-0.04		1.11	1.39	2.50	0.20			
	Graduated co	13	141.55	1.32	141.01	1.20	-0.54	-0.07		1.73	1.45	3.18	0.41			
	Unknown	6	118.54	1.47	120.71	1.57	2.17	0.13		2.17	2.48	4.64	0.28			
Not eligible	Did not finish	1	142.55	2.62	143.26	3.20	0.71	0.01		6.85	10.24	17.09	0.17			
	Graduated hig	6	149.81	1.62	147.21	1.86	-2.60	-0.16		2.62	3.45	6.07	0.36			
	Some educati	7	157.04	1.58	157.74	1.53	0.70	0.05		2.51	2.33	4.84	0.34			
	Graduated co	36	165.12	0.98	167.08	1.11	1.96	0.70		0.96	1.24	2.20	0.79			
	Unknown	2	136.17	2.87	135.63	2.30	-0.54	-0.01		8.22	5.29	13.51	0.27			
Information not a	Did not finish	0	‡	†	‡	†										
	Graduated hig	0	‡	†	‡	†										
	Some educati	1	‡	†	‡	†										
	Graduated co	4	162.42	3.47	169.41	3.37	6.99	0.28		12.04	11.35	23.38	0.94			
	Unknown	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by availability of computers for writing instruction (collapsed) [T117401], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	144	(1.6)	142	(1.2)
			Black	126	(1.4)	125	(1.6)
			Hispanic	130	(1.1)	131	(1.0)
			Asian	157	(3.2)	143	(4.3)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	141	(2.3)	143	(2.2)
		Not eligible	White	163	(1.0)	165	(1.2)
			Black	144	(1.8)	145	(2.0)
			Hispanic	152	(1.4)	151	(1.4)
			Asian	176	(2.3)	173	(3.4)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	158	(2.1)	163	(1.9)
		Information not available	White	162	(4.3)	171	(3.4)
			Black	‡	†	‡	†
			Hispanic	143	(4.6)	161	(5.4)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	0.60	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.17	**0.26**	**0.791**
Eligible	White	13	143.67	1.58	141.54	1.20	-2.13	-0.28		2.49	1.44	3.93	0.51			
	Black	8	125.98	1.44	125.35	1.63	-0.63	-0.05		2.06	2.65	4.71	0.38			
	Hispan	16	130.40	1.10	131.30	1.00	0.90	0.14		1.22	1.01	2.23	0.36			
	Asian	1	157.06	3.18	143.39	4.27	-13.67	-0.14		10.09	18.25	28.35	0.28			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	3	140.74	2.29	142.62	2.21	1.88	0.06		5.23	4.89	10.11	0.30			
Not eligible	White	35	163.45	0.97	164.63	1.21	1.18	0.41		0.95	1.46	2.41	0.84			
	Black	3	144.44	1.85	144.66	2.01	0.21	0.01		3.41	4.04	7.46	0.22			
	Hispan	8	151.55	1.42	150.52	1.37	-1.03	-0.08		2.01	1.87	3.88	0.31			
	Asian	2	175.86	2.34	172.86	3.41	-2.99	-0.06		5.49	11.61	17.10	0.34			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	3	158.41	2.09	162.51	1.93	4.10	0.12		4.39	3.71	8.10	0.24			
Information not av	White	3	161.72	4.26	171.31	3.36	9.59	0.29		18.11	11.26	29.38	0.88			
	Black	0	‡	†	‡	†										
	Hispan	1	142.68	4.56	160.56	5.35	17.88	0.18		20.82	28.67	49.50	0.49			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by availability of computers for writing instruction (collapsed) [T117401], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	132	(1.8)	127	(2.3)
			Graduated high school	131	(1.9)	133	(1.7)
			Some education after high school	146	(2.2)	144	(1.8)
			Graduated college	155	(1.7)	158	(2.0)
			Unknown	119	(2.5)	122	(2.2)
		Suburb	Did not finish high school	136	(2.4)	136	(2.3)
			Graduated high school	139	(1.8)	143	(1.7)
			Some education after high school	150	(2.0)	151	(1.8)
			Graduated college	164	(1.5)	166	(1.5)
			Unknown	127	(2.2)	130	(2.4)
		Town	Did not finish high school	‡	†	135	(4.9)
			Graduated high school	139	(4.2)	139	(2.8)
			Some education after high school	154	(2.6)	156	(3.2)
			Graduated college	153	(2.0)	159	(1.7)
			Unknown	120	(4.8)	122	(4.0)
		Rural	Did not finish high school	139	(3.0)	134	(3.9)
			Graduated high school	142	(2.6)	139	(2.5)
			Some education after high school	152	(2.2)	151	(2.0)
			Graduated college	157	(2.0)	159	(1.9)
			Unknown	127	(2.7)	126	(2.6)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	1.68	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.33	**0.58**	**0.561**
City	Did no	3	131.63	1.79	127.20	2.26	-4.43	-0.13		3.20	5.11	8.30	0.25			
	Gradu	4	130.98	1.92	132.97	1.69	1.99	0.08		3.67	2.86	6.53	0.26			
	Some	4	145.98	2.19	144.15	1.81	-1.83	-0.07		4.80	3.29	8.09	0.32			
	Gradu	13	154.70	1.74	157.60	2.01	2.90	0.38		3.02	4.05	7.07	0.92			
	Unkno	3	118.89	2.50	122.10	2.21	3.22	0.10		6.27	4.87	11.14	0.33			
Suburb	Did no	2	135.73	2.35	136.30	2.28	0.57	0.01		5.52	5.19	10.71	0.21			
	Gradu	5	139.38	1.76	142.75	1.67	3.37	0.17		3.10	2.78	5.88	0.29			
	Some	6	149.65	2.05	151.21	1.76	1.56	0.09		4.20	3.10	7.30	0.44			
	Gradu	22	164.07	1.51	166.27	1.49	2.20	0.48		2.28	2.21	4.49	0.99			
	Unkno	3	127.12	2.18	130.23	2.44	3.11	0.09		4.77	5.97	10.75	0.32			
Town	Did no	1	‡	†	135.02	4.92					24.17					
	Gradu	2	139.34	4.20	138.59	2.76	-0.75	-0.02		17.63	7.64	25.26	0.51			
	Some	2	153.63	2.55	156.48	3.24	2.85	0.06		6.51	10.52	17.03	0.34			
	Gradu	6	152.52	2.04	158.63	1.71	6.11	0.37		4.18	2.93	7.11	0.43			
	Unkno	1	119.80	4.81	122.37	4.00	2.57	0.03		23.12	16.02	39.13	0.39			
Rural	Did no	1	138.77	2.96	133.78	3.87	-4.99	-0.05		8.78	15.01	23.80	0.24			
	Gradu	4	141.67	2.62	138.76	2.50	-2.91	-0.12		6.84	6.23	13.08	0.52			
	Some	4	151.74	2.18	150.75	2.01	-0.99	-0.04		4.76	4.02	8.78	0.35			
	Gradu	12	156.89	2.05	159.04	1.90	2.15	0.26		4.20	3.60	7.79	0.93			
	Unkno	2	126.61	2.68	126.27	2.61	-0.34	-0.01		7.18	6.80	13.98	0.28			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by availability of computers for writing instruction (collapsed) [T117401], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	159	(2.1)	161	(2.1)
			Black	130	(2.2)	127	(2.7)
			Hispanic	133	(1.9)	137	(1.7)
			Asian	163	(2.9)	159	(3.4)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	147	(2.7)	151	(2.9)
		Suburb	White	164	(1.6)	165	(1.8)
			Black	134	(2.5)	138	(1.9)
			Hispanic	140	(1.7)	140	(1.4)
			Asian	175	(3.1)	173	(3.3)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	156	(3.2)	156	(2.5)
		Town	White	151	(1.8)	155	(1.8)
			Black	130	(4.0)	‡	†
			Hispanic	137	(3.4)	137	(2.7)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	155	(4.1)
		Rural	White	155	(1.7)	154	(1.9)
			Black	131	(3.0)	134	(4.9)
			Hispanic	141	(2.6)	140	(2.0)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	147	(3.2)	151	(3.3)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	1.07	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.73	**0.36**	**0.716**
City	White	9	158.74	2.11	160.90	2.11	2.16	0.19		4.43	4.47	8.90	0.80			
	Black	5	129.54	2.22	126.65	2.69	-2.89	-0.14		4.94	7.25	12.19	0.61			
	Hispan	10	133.13	1.92	137.16	1.65	4.03	0.40		3.68	2.73	6.41	0.64			
	Asian	2	162.91	2.95	159.23	3.36	-3.68	-0.07		8.70	11.31	20.01	0.40			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	2	146.61	2.71	150.93	2.85	4.32	0.09		7.37	8.13	15.50	0.31			
Suburb	White	20	163.54	1.65	164.98	1.76	1.44	0.29		2.71	3.10	5.81	1.16			
	Black	4	133.85	2.46	137.66	1.85	3.81	0.15		6.06	3.43	9.48	0.38			
	Hispan	10	139.92	1.71	140.33	1.45	0.41	0.04		2.91	2.10	5.01	0.50			
	Asian	2	174.88	3.12	172.73	3.31	-2.16	-0.04		9.73	10.95	20.68	0.41			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	155.74	3.16	155.95	2.54	0.21	0.01		9.98	6.43	16.41	0.49			
Town	White	8	151.24	1.81	155.25	1.78	4.01	0.32		3.26	3.17	6.43	0.51			
	Black	1	130.39	3.99	‡	†				15.95						
	Hispan	2	137.05	3.36	137.08	2.67	0.02	0.00		11.31	7.13	18.45	0.37			
	Asian	0	‡	†	‡	†										
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	1	‡	†	154.87	4.07					16.54					
Rural	White	15	155.33	1.66	153.72	1.88	-1.61	-0.24		2.77	3.54	6.31	0.95			
	Black	2	130.79	2.96	134.16	4.91	3.37	0.07		8.77	24.15	32.92	0.66			
	Hispan	3	140.96	2.57	139.99	1.98	-0.96	-0.03		6.62	3.90	10.52	0.32			
	Asian	0	‡	†	‡	†										
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	1	147.06	3.22	151.43	3.27	4.37	0.04		10.39	10.68	21.07	0.21			

National Center for Education Statistics (NCES)
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National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by availability of computers for writing instruction (collapsed) [T117401], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	143	(3.0)	136	(2.7)
			Black	118	(3.8)	113	(3.7)
			Hispanic	132	(1.4)	132	(1.6)
			Asian	†	†	†	†
			American Indian/Alaska Native	‡	‡	‡	‡
			Native Hawaiian/Other Pacific Islander	‡	‡	‡	‡
			Two or more races	‡	‡	‡	‡
		Graduated high school	White	147	(1.7)	145	(1.7)
			Black	123	(2.0)	124	(2.6)
			Hispanic	132	(1.6)	135	(1.7)
			Asian	‡	‡	‡	‡
			American Indian/Alaska Native	‡	‡	‡	‡
			Native Hawaiian/Other Pacific Islander	‡	‡	‡	‡
			Two or more races	140	(3.3)	141	(4.0)
		Some education after high school	White	156	(1.3)	157	(1.4)
			Black	137	(2.3)	136	(2.3)
			Hispanic	145	(1.5)	144	(2.1)
			Asian	‡	‡	‡	‡
			American Indian/Alaska Native	‡	‡	‡	‡
			Native Hawaiian/Other Pacific Islander	‡	‡	‡	‡
			Two or more races	152	(3.9)	149	(2.5)
		Graduated college	White	165	(1.0)	167	(1.1)
			Black	138	(1.6)	138	(2.1)
			Hispanic	150	(1.7)	151	(1.3)
			Asian	173	(2.1)	172	(2.8)
			American Indian/Alaska Native	‡	‡	‡	‡
			Native Hawaiian/Other Pacific Islander	‡	‡	‡	‡
			Two or more races	155	(1.8)	161	(2.1)
		Unknown	White	132	(2.6)	131	(2.3)
			Black	114	(3.7)	116	(3.7)
			Hispanic	118	(1.5)	120	(1.7)
			Asian	†	†	146	(6.1)
			American Indian/Alaska Native	†	†	†	†
			Native Hawaiian/Other Pacific Islander	‡	‡	‡	‡
			Two or more races	‡	‡	‡	‡

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	0.89	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.88	0.37	0.714
Did not finish high	White	2	142.66	3.03	135.88	2.66	-6.78	-0.14		9.17	7.09	16.26	0.33			
	Black	1	117.74	3.80	112.92	3.73	-4.82	-0.05		14.46	13.95	28.40	0.28			
	Hispan	4	132.16	1.42	132.14	1.62	-0.02	0.00		2.01	2.62	4.64	0.19			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										
Graduated high sc	White	7	147.30	1.69	144.52	1.66	-2.78	-0.19		2.87	2.75	5.61	0.39			
	Black	2	122.62	2.00	124.42	2.63	1.80	0.04		4.01	6.93	10.94	0.22			
	Hispan	5	131.76	1.60	134.51	1.70	2.75	0.14		2.57	2.89	5.46	0.27			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	139.90	3.34	141.37	4.00	1.48	0.01		11.15	16.00	27.15	0.27			
Some education a	White	7	155.71	1.34	156.66	1.44	0.95	0.07		1.80	2.06	3.86	0.27			
	Black	2	136.84	2.29	136.46	2.30	-0.39	-0.01		5.26	5.27	10.52	0.21			
	Hispan	4	144.68	1.54	144.09	2.11	-0.58	-0.02		2.36	4.45	6.81	0.27			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	151.91	3.88	149.46	2.54	-2.45	-0.02		15.04	6.47	21.51	0.22			
Graduated college	White	33	164.74	1.00	166.90	1.15	2.16	0.71		1.01	1.31	2.32	0.77			
	Black	5	138.49	1.59	138.14	2.13	-0.34	-0.02		2.54	4.55	7.09	0.35			
	Hispan	8	149.81	1.68	150.79	1.30	0.98	0.08		2.81	1.70	4.51	0.36			
	Asian	3	172.99	2.08	171.91	2.57	-1.08	-0.03		4.33	6.59	10.91	0.33			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	4	155.17	1.81	160.94	2.06	5.76	0.23		3.29	4.23	7.52	0.30			
Unknown	White	3	131.89	2.58	131.03	2.32	-0.86	-0.03		6.68	5.36	12.04	0.36			
	Black	1	114.16	3.69	115.88	3.71	1.72	0.02		13.60	13.74	27.34	0.27			
	Hispan	4	117.86	1.52	120.49	1.74	2.63	0.11		2.31	3.04	5.35	0.21			
	Asian	0	‡	†	145.76	6.08					36.93					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										

Appendix C.7

Ask Students to Check Spelling Calculations

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use word processing to check spelling (collapsed) [T118403], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	low use (collapsed)		high use (collapsed)	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	122	(1.0)	127	(1.0)
			Not eligible	148	(1.1)	153	(1.1)
			Information not available	149	(4.7)	157	(3.4)
		Female	Eligible	141	(0.9)	147	(0.8)
			Not eligible	167	(1.0)	173	(1.0)
			Information not available	162	(4.3)	175	(3.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
		Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.08	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.80	**3.12**	**0.002**
Gender	National School Lunch Program eligibility, 3 categories															
Male	Eligible	21	121.61	1.05	127.42	0.96	5.81	1.22		1.09	0.93	2.02	0.42			
	Not eligib	27	147.52	1.09	152.92	1.06	5.40	1.46		1.19	1.13	2.32	0.63			
	Informatid	3	148.87	4.74	156.87	3.37	8.00	0.24		22.45	11.32	33.78	1.01			
Female	Eligible	21	141.15	0.90	146.74	0.85	5.60	1.18		0.80	0.72	1.52	0.32			
	Not eligib	26	167.05	0.95	173.18	1.03	6.13	1.59		0.90	1.06	1.96	0.51			
	Informatid	3	161.90	4.31	175.12	3.42	13.22	0.40		18.61	11.69	30.30	0.91			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use word processing to check spelling (collapsed) [T118403], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	129	(1.7)	140	(1.5)
			Suburb	138	(1.7)	148	(1.5)
			Town	138	(2.1)	138	(2.4)
			Rural	135	(1.7)	144	(1.7)
		Female	City	146	(1.9)	157	(1.5)
			Suburb	157	(1.8)	168	(1.5)
			Town	158	(2.1)	160	(1.9)
			Rural	156	(1.9)	163	(1.8)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.16	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.11	**3.71**	**0.000**
Male	City	14	128.96	1.73	139.51	1.47	10.55	1.48		3.00	2.15	5.15	0.72			
	Suburb	19	137.69	1.70	148.42	1.53	10.73	2.04		2.89	2.33	5.22	0.99			
	Town	6	137.62	2.05	137.64	2.42	0.02	0.00		4.22	5.85	10.07	0.60			
	Rural	12	135.27	1.74	143.61	1.68	8.34	1.00		3.02	2.81	5.83	0.70			
Female	City	14	146.10	1.93	157.45	1.47	11.36	1.59		3.74	2.16	5.90	0.83			
	Suburb	19	156.80	1.84	168.03	1.48	11.23	2.13		3.39	2.20	5.59	1.06			
	Town	6	157.95	2.08	159.85	1.87	1.91	0.11		4.32	3.51	7.83	0.47			
	Rural	11	155.86	1.85	163.21	1.81	7.35	0.81		3.43	3.27	6.70	0.74			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use word processing to check spelling (collapsed) [T118403], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	121	(1.7)	125	(1.7)
			Graduated high school	124	(1.6)	131	(1.4)
			Some education after high school	136	(1.5)	140	(1.3)
			Graduated college	145	(1.2)	154	(1.0)
			Unknown	111	(1.8)	118	(1.8)
		Female	Did not finish high school	136	(1.8)	146	(1.7)
			Graduated high school	145	(1.4)	150	(1.2)
			Some education after high school	158	(1.4)	162	(1.3)
			Graduated college	164	(1.1)	173	(1.0)
			Unknown	131	(2.1)	138	(1.7)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	5.96	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	2.15	**4.07**	**0.000**
Male	Did not fin	0	121.48	1.69	125.00	1.71	3.52	0.00		2.87	2.92	5.79	0.00			
	Graduated	8	124.07	1.58	131.27	1.41	7.21	0.58		2.49	1.98	4.47	0.36			
	Some edu	7	135.80	1.46	140.13	1.32	4.33	0.30		2.14	1.74	3.88	0.27			
	Graduated	27	144.91	1.16	154.01	1.04	9.10	2.46		1.35	1.07	2.42	0.65			
	Unknown	0	111.45	1.84	118.38	1.77	6.93	0.00		3.40	3.13	6.52	0.00			
Female	Did not fin	0	135.86	1.82	145.68	1.70	9.82	0.00		3.33	2.88	6.20	0.00			
	Graduated	0	144.88	1.36	150.20	1.15	5.32	0.00		1.86	1.33	3.20	0.00			
	Some edu	8	157.51	1.44	162.16	1.32	4.65	0.37		2.08	1.75	3.83	0.31			
	Graduated	26	164.38	1.08	173.05	0.99	8.66	2.25		1.16	0.99	2.14	0.56			
	Unknown	0	130.95	2.11	138.12	1.70	7.16	0.00		4.47	2.89	7.36	0.00			

National Center for Education Statistics (NCES)
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This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use word processing to check spelling (collapsed) [T118403], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	144	(1.1)	152	(1.1)
			Black	119	(1.5)	126	(1.5)
			Hispanic	125	(1.4)	132	(1.1)
			Asian	152	(3.6)	160	(3.4)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	136	(2.7)	144	(1.9)
		Female	White	164	(1.0)	172	(1.0)
			Black	137	(1.7)	143	(1.6)
			Hispanic	142	(1.2)	151	(1.0)
			Asian	171	(2.7)	176	(2.4)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	158	(2.1)	164	(1.9)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.46	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.78	**3.84**	**0.000**
Male	White	26	143.84	1.12	151.67	1.14	7.83	2.04		1.25	1.30	2.55	0.66			
	Black	6	119.32	1.50	126.34	1.55	7.01	0.42		2.24	2.39	4.63	0.28			
	Hispanic	13	124.64	1.44	131.62	1.07	6.98	0.91		2.08	1.14	3.22	0.42			
	Asian	2	151.64	3.59	160.25	3.40	8.60	0.17		12.91	11.53	24.45	0.49			
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	3	136.39	2.73	143.79	1.87	7.39	0.22		7.44	3.51	10.94	0.33			
Female	White	25	163.95	1.02	171.53	0.98	7.58	1.89		1.05	0.96	2.01	0.50			
	Black	6	137.24	1.66	142.77	1.59	5.53	0.33		2.77	2.53	5.30	0.32			
	Hispanic	12	141.70	1.15	151.40	0.98	9.70	1.16		1.33	0.96	2.29	0.28			
	Asian	2	170.90	2.73	176.46	2.36	5.55	0.11		7.43	5.57	13.00	0.26			
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	3	157.57	2.13	164.35	1.94	6.79	0.20		4.54	3.77	8.31	0.25			

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Average scale scores for writing, grade 8 by ask students to use word processing to check spelling (collapsed) [T118403], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	126	(1.4)	133	(1.4)
			Suburb	134	(1.7)	139	(1.1)
			Town	136	(2.7)	138	(1.8)
			Rural	135	(1.6)	140	(1.8)
		Not eligible	City	158	(1.8)	160	(1.6)
			Suburb	159	(1.5)	167	(1.5)
			Town	158	(2.0)	155	(1.9)
			Rural	154	(1.3)	161	(1.7)
		Information not available	City	148	(4.9)	169	(4.1)
			Suburb	158	(7.1)	166	(6.6)
			Town	‡	†	157	(5.3)
			Rural	‡	†	153	(4.2)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-3.80	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	########	-0.01	0.993
Eligible	City	126.3221519	1.36	133.24	1.44	2.67	0.08	0.10		17752.34	7.13	17759.47	22434.14			
	Suburb	133.6223502	1.68	138.99	1.08	4.38	-0.59	-0.79		19316.91	19.15	19336.06	25837.29			
	Town	135.5377649	2.73	137.74	1.81	†	-0.92	-1.25		18973.41						
	Rural	134.6247641	1.63	139.56	1.77	4.65	0.14	0.19		19475.96	21.61	19497.57	26248.56			
Not eligible	City	157.6981701	1.83	160.02	1.63	4.36	-0.20	-0.32		25607.38	19.00	25626.38	40412.33			
	Suburb	158.6312668	1.49	166.61	1.45	3.47	-0.04	-0.06		27758.84	12.01	27770.85	44053.26			
	Town	158.2688573	1.98	155.50	1.92	†	-0.06	-0.10		24178.96						
	Rural	154.06971	1.35	160.76	1.72	3.99	0.37	0.57		25842.48	15.92	25858.40	39839.96			
Information not av	City	148.4384371	4.92	169.44	4.10	†	-0.82	-1.22		28711.36						
	Suburb	157.883983	7.14	165.58	6.55	†	-0.59	-0.92		27415.41						
	Town	‡	†	157.33	5.31	†				24753.56						
	Rural	‡	†	152.59	4.16	†				23284.32						

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Average scale scores for writing, grade 8 by ask students to use word processing to check spelling (collapsed) [T118403], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	128	(1.5)	134	(1.5)
			Graduated high school	129	(1.2)	133	(1.1)
			Some education after high school	142	(1.3)	144	(1.2)
			Graduated college	137	(1.2)	144	(1.3)
			Unknown	116	(1.7)	123	(1.4)
		Not eligible	Did not finish high school	140	(4.0)	144	(2.3)
			Graduated high school	146	(1.9)	150	(1.7)
			Some education after high school	155	(1.9)	158	(1.6)
			Graduated college	162	(0.8)	168	(1.1)
			Unknown	136	(2.7)	136	(2.5)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	‡	†	‡	†
			Some education after high school	‡	†	157	(3.7)
			Graduated college	159	(4.2)	170	(2.7)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-5.79	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	########	-0.01	0.989
Eligible	Did not fin	127.978424	1.47	134.24	1.51	5.19	0.04	0.05		18019.51	26.89	18046.40	23095.50			
	Graduated	129.0705923	1.17	133.36	1.07	4.40	-0.09	-0.12		17784.08	19.35	17803.43	22979.00			
	Some edu	141.7297552	1.27	143.67	1.19	3.90	-0.07	-0.10		20640.15	15.21	20655.36	29274.80			
	Graduated	137.0688738	1.19	144.12	1.26	3.65	0.07	0.09		20770.12	13.35	20783.47	28487.67			
	Unknown	115.7849349	1.71	122.73	1.42	4.85	-0.29	-0.34		15061.89	23.54	15085.44	17466.66			
Not eligible	Did not fin	140.4865607	4.03	144.16	2.33	†	-1.69	-2.38		20783.10						
	Graduated	145.9168327	1.88	149.62	1.65	†	-0.23	-0.34		22385.77						
	Some edu	155.3031639	1.91	158.37	1.60	†	-0.31	-0.47		25082.01						
	Graduated	161.8901638	0.84	168.05	1.07	2.14	0.22	0.36		28241.64	4.59	28246.23	45727.87			
	Unknown	135.8273435	2.67	135.65	2.48	†	-0.18	-0.25		18399.68						
Information not a	Did not fin	‡	†	‡	†	†										
	Graduated	‡	†	‡	†	†										
	Some edu	‡	†	157.19	3.65	†				24707.51						
	Graduated	158.7135497	4.17	170.46	2.72	†	-1.45	-2.30		29056.01						
	Unknown	‡	†	‡	†	†										

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Average scale scores for writing, grade 8 by ask students to use word processing to check spelling (collapsed) [T118403], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	140	(1.4)	144	(1.2)
			Black	124	(1.3)	128	(1.5)
			Hispanic	128	(1.1)	133	(0.8)
			Asian	145	(3.8)	153	(3.6)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	140	(3.0)	143	(2.0)
		Not eligible	White	160	(0.8)	166	(1.1)
			Black	143	(2.0)	145	(1.9)
			Hispanic	149	(1.8)	153	(1.2)
			Asian	174	(2.9)	174	(2.8)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	156	(2.5)	163	(2.0)
		Information not available	White	162	(4.4)	170	(3.1)
			Black	‡	†	148	(4.9)
			Hispanic	‡	†	159	(5.0)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	5.01	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.52	**2.36**	**0.018**
Eligible	White	13	139.66	1.42	144.32	1.17	4.66	0.61		2.02	1.36	3.39	0.44			
	Black	8	123.63	1.27	127.75	1.53	4.12	0.33		1.61	2.35	3.97	0.32			
	Hispanic	16	127.59	1.15	133.43	0.84	5.84	0.93		1.31	0.71	2.02	0.32			
	Asian	1	144.82	3.78	153.27	3.61	8.45	0.08		14.32	13.00	27.32	0.27			
	American Indian/	0	‡	†	‡	†										
	Native Hawaiian/	0	‡	†	‡	†										
	Two or more race	3	140.22	2.95	142.71	1.95	2.50	0.07		8.72	3.80	12.53	0.38			
Not eligible	White	35	159.84	0.80	165.89	1.14	6.05	2.12		0.64	1.29	1.93	0.68			
	Black	3	143.31	2.03	145.20	1.86	1.89	0.06		4.10	3.45	7.55	0.23			
	Hispanic	8	148.57	1.85	152.73	1.17	4.16	0.33		3.41	1.37	4.78	0.38			
	Asian	2	173.62	2.90	174.44	2.84	0.81	0.02		8.39	8.06	16.44	0.33			
	American Indian/	0	‡	†	‡	†										
	Native Hawaiian/	0	‡	†	‡	†										
	Two or more race	3	155.63	2.49	162.66	1.98	7.03	0.21		6.20	3.92	10.11	0.30			
Information not av	White	3	161.78	4.39	169.95	3.13	8.17	0.24		19.23	9.80	29.03	0.87			
	Black	0	‡	†	148.11	4.86					23.65					
	Hispanic	1	‡	†	158.88	5.05					25.48					
	Asian	0	‡	†	‡	†										
	American Indian/	0	‡	†	‡	†										
	Native Hawaiian/	0	‡	†	‡	†										
	Two or more race	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by ask students to use word processing to check spelling (collapsed) [T118403], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	125	(2.2)	134	(2.0)
			Graduated high school	129	(1.9)	134	(1.5)
			Some education after high school	142	(2.3)	147	(1.6)
			Graduated college	150	(2.2)	160	(1.4)
			Unknown	115	(2.1)	125	(2.2)
		Suburb	Did not finish high school	131	(2.6)	139	(2.1)
			Graduated high school	137	(2.0)	144	(1.6)
			Some education after high school	147	(2.2)	152	(1.9)
			Graduated college	158	(1.5)	168	(1.4)
			Unknown	127	(3.0)	130	(2.1)
		Town	Did not finish high school	‡	†	135	(6.8)
			Graduated high school	135	(3.5)	141	(2.9)
			Some education after high school	157	(3.0)	153	(2.5)
			Graduated college	156	(1.9)	156	(1.4)
			Unknown	120	(6.5)	122	(3.2)
		Rural	Did not finish high school	135	(3.3)	137	(3.8)
			Graduated high school	137	(2.5)	142	(2.2)
			Some education after high school	148	(1.8)	154	(2.5)
			Graduated college	153	(1.9)	161	(1.8)
			Unknown	122	(3.3)	130	(2.3)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.05	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.15	2.47	0.014
City	Did not fin	3	124.78	2.23	133.92	2.01	9.14	0.27		4.98	4.06	9.04	0.27			
	Graduated	4	128.87	1.87	134.27	1.47	5.41	0.22		3.49	2.16	5.65	0.23			
	Some edu	4	141.56	2.26	147.31	1.64	5.76	0.23		5.12	2.69	7.81	0.31			
	Graduated	13	149.69	2.16	160.05	1.37	10.35	1.35		4.66	1.88	6.54	0.85			
	Unknown	3	114.56	2.15	124.70	2.23	10.14	0.30		4.62	4.95	9.57	0.29			
Suburb	Did not fin	2	130.76	2.55	139.26	2.08	8.51	0.17		6.52	4.34	10.86	0.22			
	Graduated	5	136.74	2.00	143.64	1.56	6.91	0.35		4.02	2.44	6.46	0.32			
	Some edu	6	146.58	2.23	152.38	1.87	5.80	0.35		4.98	3.49	8.46	0.51			
	Graduated	22	157.97	1.53	167.70	1.43	9.73	2.14		2.35	2.05	4.39	0.97			
	Unknown	3	126.65	2.96	129.86	2.12	3.20	0.10		8.74	4.49	13.23	0.40			
Town	Did not fin	1	‡	†	135.18	6.83					46.68					
	Graduated	2	134.97	3.51	140.61	2.87	5.64	0.11		12.34	8.25	20.59	0.41			
	Some edu	2	157.33	3.03	153.25	2.52	-4.07	-0.08		9.17	6.36	15.53	0.31			
	Graduated	6	156.33	1.88	156.00	1.38	-0.32	-0.02		3.54	1.91	5.45	0.33			
	Unknown	1	119.81	6.47	122.06	3.20	2.25	0.02		41.89	10.23	52.12	0.52			
Rural	Did not fin	1	134.99	3.34	137.02	3.83	2.03	0.02		11.13	14.66	25.78	0.26			
	Graduated	4	137.37	2.53	141.91	2.20	4.54	0.18		6.39	4.84	11.23	0.45			
	Some edu	4	147.87	1.84	153.77	2.48	5.90	0.24		3.40	6.16	9.55	0.38			
	Graduated	12	152.93	1.87	160.86	1.81	7.93	0.95		3.49	3.29	6.78	0.81			
	Unknown	2	122.39	3.27	129.85	2.32	7.46	0.15		10.70	5.38	16.08	0.32			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use word processing to check spelling (collapsed) [T118403], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	155	(2.0)	163	(1.6)
			Black	124	(2.2)	131	(2.4)
			Hispanic	130	(1.8)	139	(1.8)
			Asian	154	(4.0)	164	(2.6)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	144	(2.4)	151	(2.6)
		Suburb	White	158	(1.7)	166	(1.6)
			Black	131	(2.5)	138	(2.0)
			Hispanic	136	(2.0)	143	(1.3)
			Asian	167	(4.2)	176	(2.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	152	(3.7)	157	(2.7)
		Town	White	154	(1.9)	153	(1.5)
			Black	‡	†	127	(6.3)
			Hispanic	132	(2.9)	141	(1.9)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	152	(3.5)
		Rural	White	149	(1.6)	157	(1.6)
			Black	132	(2.9)	133	(4.8)
			Hispanic	137	(2.3)	144	(2.0)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	143	(4.2)	153	(2.9)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.01	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.32	**2.43**	**0.015**
City	White	9	154.75	2.01	162.70	1.63	7.96	0.72		4.03	2.66	6.69	0.60			
	Black	5	123.87	2.16	131.35	2.38	7.49	0.37		4.66	5.67	10.33	0.52			
	Hispanic	10	129.72	1.81	138.99	1.77	9.27	0.93		3.29	3.13	6.42	0.64			
	Asian	2	153.94	3.95	164.25	2.56	10.32	0.21		15.62	6.57	22.20	0.44			
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	2	144.05	2.41	151.20	2.58	7.15	0.14		5.80	6.63	12.43	0.25			
Suburb	White	20	158.05	1.69	166.41	1.62	8.35	1.67		2.84	2.61	5.46	1.09			
	Black	4	130.76	2.54	138.46	1.99	7.70	0.31		6.45	3.94	10.39	0.42			
	Hispanic	10	135.50	1.98	142.98	1.29	7.48	0.75		3.93	1.66	5.60	0.56			
	Asian	2	167.35	4.24	176.13	2.90	8.78	0.18		18.01	8.42	26.43	0.53			
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	3	152.33	3.73	157.33	2.66	5.00	0.15		13.88	7.08	20.96	0.63			
Town	White	8	154.17	1.89	153.06	1.52	-1.11	-0.09		3.57	2.31	5.88	0.47			
	Black	1	‡	†	127.01	6.32					39.93					
	Hispanic	2	132.03	2.92	140.82	1.89	8.79	0.18		8.55	3.57	12.13	0.24			
	Asian	0	‡	†	‡	†										
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	1	‡	†	152.02	3.46					11.99					
Rural	White	15	149.36	1.58	157.29	1.65	7.92	1.19		2.51	2.72	5.23	0.78			
	Black	2	132.31	2.86	133.36	4.77	1.05	0.02		8.17	22.74	30.90	0.62			
	Hispanic	3	137.22	2.31	143.58	1.95	6.36	0.19		5.35	3.80	9.16	0.27			
	Asian	0	‡	†	‡	†										
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	1	142.75	4.18	152.99	2.89	10.24	0.10		17.51	8.34	25.85	0.26			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use word processing to check spelling (collapsed) [T118403], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	135	(3.4)	142	(2.7)
			Black	113	(4.5)	118	(4.1)
			Hispanic	129	(1.6)	135	(1.4)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	142	(2.1)	147	(1.6)
			Black	123	(2.3)	124	(2.2)
			Hispanic	129	(1.6)	136	(1.7)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	139	(4.5)	141	(3.3)
		Some education after high school	White	154	(1.8)	157	(1.5)
			Black	134	(2.3)	139	(2.2)
			Hispanic	142	(1.9)	146	(1.6)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	148	(4.1)	152	(3.3)
		Graduated college	White	161	(1.0)	168	(1.1)
			Black	133	(1.6)	142	(1.6)
			Hispanic	145	(2.0)	154	(1.3)
			Asian	168	(2.9)	174	(2.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	153	(2.4)	160	(1.9)
		Unknown	White	129	(3.1)	132	(2.2)
			Black	113	(3.8)	117	(3.3)
			Hispanic	115	(1.9)	122	(1.6)
			Asian	‡	†	153	(5.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.07	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.42	2.40	0.017
Did not finish high	White	2	135.00	3.36	141.97	2.65	6.97	0.14		11.31	7.02	18.33	0.37			
	Black	1	113.12	4.52	117.83	4.08	4.70	0.05		20.47	16.66	37.12	0.37			
	Hispanic	4	129.11	1.62	134.65	1.40	5.54	0.22		2.64	1.96	4.60	0.18			
	Asian	0	‡	†	‡	†										
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	0	‡	†	‡	†										
Graduated high sc	White	7	142.32	2.10	147.45	1.63	5.13	0.36		4.41	2.66	7.06	0.49			
	Black	2	123.48	2.25	123.72	2.25	0.24	0.00		5.08	5.06	10.14	0.20			
	Hispanic	5	129.11	1.61	136.18	1.69	7.07	0.35		2.60	2.85	5.45	0.27			
	Asian	0	‡	†	‡	†										
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	1	139.35	4.49	141.33	3.27	1.98	0.02		20.13	10.66	30.80	0.31			
Some education a	White	7	154.30	1.77	157.22	1.52	2.92	0.20		3.12	2.31	5.43	0.38			
	Black	2	134.04	2.32	139.06	2.21	5.03	0.10		5.39	4.86	10.26	0.21			
	Hispanic	4	142.16	1.93	145.84	1.61	3.68	0.15		3.74	2.60	6.34	0.25			
	Asian	0	‡	†	‡	†										
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	1	148.24	4.12	152.14	3.34	3.90	0.04		17.00	11.15	28.15	0.28			
Graduated college	White	33	160.83	1.00	168.13	1.09	7.30	2.41		0.99	1.18	2.17	0.72			
	Black	5	133.12	1.58	141.79	1.55	8.67	0.43		2.48	2.42	4.90	0.24			
	Hispanic	8	144.81	1.97	153.76	1.34	8.96	0.72		3.90	1.80	5.70	0.46			
	Asian	3	168.44	2.88	174.28	2.13	5.84	0.18		8.30	4.55	12.85	0.39			
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	4	153.23	2.36	160.40	1.92	7.16	0.29		5.58	3.69	9.27	0.37			
Unknown	White	3	129.46	3.08	132.35	2.16	2.89	0.09		9.50	4.66	14.16	0.42			
	Black	1	112.94	3.80	116.56	3.32	3.62	0.04		14.45	11.00	25.46	0.25			
	Hispanic	4	115.06	1.88	122.34	1.63	7.28	0.29		3.52	2.65	6.17	0.25			
	Asian	0	‡	†	153.40	5.48					30.06					
	American	0	‡	†	‡	†										
	Native Ha	0	‡	†	‡	†										
	Two or mo	0	‡	†	‡	†										

Appendix C.8

Complete Writing Started by Hand Calculations

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to complete writing started by hand (collapsed) [T118402], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	Eligibility, 3 categories	low use (collapsed)		high use (collapsed)	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	122	(0.9)	129	(1.0)
			Not eligible	146	(1.0)	155	(1.1)
			Information not available	152	(5.4)	156	(3.2)
		Female	Eligible	141	(0.7)	149	(1.0)
			Not eligible	167	(0.9)	174	(1.1)
			Information not available	166	(4.0)	175	(3.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.04	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.82	**4.11**	**0.000**
Male	Eligible	21	121.53	0.88	129.14	1.00	7.62	1.60		0.77	1.00	1.78	0.37			
	Not eligible	27	146.00	1.01	154.60	1.06	8.60	2.32		1.02	1.13	2.15	0.58			
	Information not available	3	152.15	5.39	156.39	3.19	4.24	0.13		29.03	10.18	39.22	1.18			
Female	Eligible	21	140.76	0.75	148.76	1.02	8.00	1.68		0.56	1.03	1.60	0.33			
	Not eligible	26	166.58	0.94	174.46	1.06	7.87	2.05		0.89	1.12	2.01	0.52			
	Information not available	3	165.68	4.01	174.59	3.43	8.91	0.27		16.06	11.79	27.85	0.84			

Figure 60. Report and analysis for bundle where the Independent variable is "Ask students to use computer to complete writing started by hand", and the control variables are "Gender" and "Eligibility for the National School Lunch Program"

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to complete writing started by hand (collapsed) [T118402], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	ion, 4 categories	rage scale score	Standard error	rage scale score	Standard error
National	2011	Male	City	129	(2.0)	141	(1.6)
			Suburb	138	(1.6)	150	(1.5)
			Town	134	(1.9)	141	(3.6)
			Rural	135	(1.7)	146	(1.7)
		Female	City	146	(1.6)	159	(1.7)
			Suburb	157	(1.7)	170	(1.5)
			Town	155	(2.0)	163	(2.0)
			Rural	156	(1.6)	165	(2.0)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	11.76	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.45	**4.63**	**0.000**
Male	City	14	128.62	2.00	141.43	1.57	12.81	1.79		3.99	2.45	6.44	0.90			
	Suburb	19	137.71	1.64	150.37	1.46	12.66	2.40		2.68	2.12	4.80	0.91			
	Town	6	134.41	1.89	141.30	3.60	6.90	0.41		3.58	12.95	16.53	0.99			
	Rural	12	134.67	1.67	145.92	1.68	11.25	1.35		2.80	2.83	5.63	0.68			
Female	City	14	145.97	1.61	159.48	1.69	13.50	1.89		2.58	2.86	5.45	0.76			
	Suburb	19	157.28	1.69	169.72	1.53	12.44	2.36		2.87	2.35	5.22	0.99			
	Town	6	155.28	1.99	163.17	1.97	7.89	0.47		3.97	3.87	7.84	0.47			
	Rural	11	155.61	1.64	165.33	2.03	9.73	1.07		2.69	4.12	6.81	0.75			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to complete writing started by hand (collapsed) [T118402], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	121	(1.6)	127	(1.7)
			Graduated high school	123	(1.4)	134	(1.5)
			Some education after high school	135	(1.3)	142	(1.3)
			Graduated college	145	(1.2)	155	(1.1)
			Unknown	111	(1.6)	121	(1.9)
		Female	Did not finish high school	137	(1.7)	147	(1.9)
			Graduated high school	145	(1.2)	152	(1.2)
			Some education after high school	157	(1.1)	164	(1.4)
			Graduated college	164	(1.0)	174	(1.0)
			Unknown	130	(1.7)	141	(1.9)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.26	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.30	**5.10**	**0.000**
Male	Did not finis	3	121.10	1.60	126.92	1.72	5.82	0.17		2.57	2.96	5.53	0.17			
	Graduated h	8	123.43	1.44	133.75	1.53	10.32	0.83		2.08	2.34	4.42	0.35			
	Some educa	7	134.91	1.31	142.09	1.34	7.18	0.50		1.72	1.80	3.52	0.25			
	Graduated c	27	145.10	1.17	155.12	1.12	10.02	2.70		1.37	1.24	2.62	0.71			
	Unknown	5	111.19	1.64	120.76	1.90	9.57	0.48		2.70	3.60	6.30	0.32			
Female	Did not finis	4	137.37	1.71	146.64	1.86	9.27	0.37		2.92	3.45	6.37	0.25			
	Graduated h	8	144.80	1.22	151.87	1.22	7.07	0.57		1.49	1.50	2.99	0.24			
	Some educa	8	156.78	1.08	163.88	1.44	7.10	0.57		1.17	2.09	3.25	0.26			
	Graduated c	26	164.26	0.96	174.46	1.02	10.21	2.65		0.92	1.04	1.96	0.51			
	Unknown	4	130.30	1.66	140.57	1.86	10.27	0.41		2.75	3.47	6.22	0.25			

Figure 62. Report and analysis for bundle where the Independent variable is "Ask students to use computer to complete writing started by hand", and the control variables of "Gender" and "Parent education level"

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to complete writing started by hand (collapsed) [T118402], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender es, student-reported		Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	143	(1.2)	153	(1.2)
			Black	120	(1.5)	128	(1.7)
			Hispanic	124	(1.1)	134	(1.3)
			Asian	150	(3.3)	162	(3.4)
			Indian/Alaska Native	‡	†	‡	†
			Other Pacific Islander	‡	†	‡	†
			Two or more races	138	(2.3)	144	(2.1)
		Female	White	164	(1.0)	173	(1.0)
			Black	138	(1.5)	143	(2.1)
			Hispanic	142	(1.1)	154	(1.2)
			Asian	168	(2.9)	178	(2.2)
			Indian/Alaska Native	‡	†	‡	†
			Other Pacific Islander	‡	†	‡	†
			Two or more races	157	(1.9)	166	(2.2)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.36	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.87	**4.76**	**0.000**
Male	White	26	143.42	1.17	153.17	1.21	9.74	2.53		1.38	1.45	2.83	0.74			
	Black	6	119.80	1.51	127.70	1.68	7.90	0.47		2.27	2.83	5.10	0.31			
	Hispanic	13	123.88	1.14	134.38	1.27	10.50	1.37		1.29	1.61	2.90	0.38			
	Asian	2	149.56	3.30	162.10	3.44	12.54	0.25		10.91	11.83	22.75	0.45			
	American Indian/	0	‡	†	‡	†										
	Native Hawaiian/	0	‡	†	‡	†										
	Two or more race	3	137.66	2.25	144.18	2.10	6.52	0.20		5.07	4.41	9.47	0.28			
Female	White	25	163.85	0.95	172.88	1.05	9.03	2.26		0.91	1.10	2.01	0.50			
	Black	6	138.00	1.46	143.44	2.08	5.44	0.33		2.13	4.34	6.47	0.39			
	Hispanic	12	141.58	1.06	154.12	1.22	12.54	1.50		1.13	1.48	2.61	0.31			
	Asian	2	168.12	2.88	178.19	2.17	10.07	0.20		8.29	4.73	13.02	0.26			
	American Indian/	0	‡	†	‡	†										
	Native Hawaiian/	0	‡	†	‡	†										
	Two or more race	3	157.33	1.87	165.77	2.18	8.44	0.25		3.51	4.74	8.25	0.25			

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Average scale scores for writing, grade 8 by ask students to use computer to complete writing started by hand (collapsed) [T118402], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year ibility, 3 categories ation, 4 categories			Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	126	(1.1)	135	(1.6)
			Suburb	133	(1.4)	141	(1.2)
			Town	134	(2.3)	141	(1.9)
			Rural	134	(1.6)	141	(1.7)
		Not eligible	City	155	(1.9)	162	(1.8)
			Suburb	160	(1.7)	167	(1.4)
			Town	154	(2.5)	159	(2.5)
			Rural	154	(1.3)	162	(1.9)
		iation not available	City	165	(8.2)	166	(4.5)
			Suburb	153	(6.4)	172	(5.9)
			Town	‡	†	‡	†
			Rural	‡	†	152	(4.4)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.56	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.40	**2.61**	**0.009**
Eligible	City	15	126.12	1.09	135.00	1.61	8.89	1.33		1.18	2.58	3.76	0.56			
	Suburb	13	133.19	1.42	140.95	1.19	7.76	1.01		2.01	1.42	3.42	0.45			
	Town	5	134.09	2.30	140.62	1.94	6.54	0.33		5.30	3.76	9.06	0.45			
	Rural	9	134.43	1.63	141.36	1.70	6.93	0.62		2.65	2.90	5.55	0.50			
Not eligible	City	10	154.71	1.86	162.21	1.77	7.51	0.75		3.46	3.13	6.59	0.66			
	Suburb	23	159.76	1.69	167.14	1.41	7.38	1.70		2.85	1.98	4.82	1.11			
	Town	6	154.09	2.46	158.74	2.49	4.66	0.28		6.06	6.22	12.28	0.74			
	Rural	13	153.68	1.30	162.37	1.88	8.69	1.13		1.69	3.54	5.22	0.68			
Information no	City	2	164.95	8.15	165.99	4.54	1.04	0.02		66.44	20.63	87.07	1.74			
	Suburb	2	152.56	6.42	172.31	5.87	19.75	0.39		41.21	34.45	75.66	1.51			
	Town	1	‡	†	‡	†										
	Rural	1	‡	†	151.68	4.38					19.17					

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Average scale scores for writing, grade 8 by ask students to use computer to complete writing started by hand (collapsed) [T118402], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

			low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	ibility, 3 categories	l, from 2 questions	verage scale score	Standard error	verage scale score	Standard error
National	2011	Eligible	t finish high school	128	(1.4)	136	(1.4)
			duated high school	128	(1.1)	135	(1.2)
			n after high school	141	(1.1)	146	(1.4)
			Graduated college	137	(0.9)	145	(1.3)
			Unknown	115	(1.5)	125	(1.8)
		Not eligible	t finish high school	141	(3.2)	145	(3.1)
			duated high school	146	(1.8)	151	(1.6)
			n after high school	155	(1.7)	160	(1.6)
			Graduated college	161	(1.0)	169	(1.1)
			Unknown	133	(2.5)	138	(2.7)
		ation not available	t finish high school	‡	†	‡	†
			duated high school	‡	†	‡	†
			n after high school	‡	†	160	(3.6)
			Graduated college	163	(3.4)	169	(3.1)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.99	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.19	**3.41**	**0.001**
Eligible	Did not finish h	6	128.13	1.42	136.08	1.38	7.95	0.48		2.01	1.92	3.92	0.24			
	Graduated high	10	128.49	1.14	135.48	1.20	6.99	0.70		1.29	1.44	2.73	0.27			
	Some educatio	8	140.71	1.09	145.58	1.36	4.88	0.39		1.19	1.86	3.04	0.24			
	Graduated colle	13	137.48	0.93	145.19	1.30	7.71	1.00		0.87	1.68	2.55	0.33			
	Unknown	6	115.38	1.50	125.24	1.76	9.86	0.59		2.24	3.08	5.33	0.32			
Not eligible	Did not finish h	1	141.08	3.23	144.95	3.07	3.87	0.04		10.43	9.41	19.84	0.20			
	Graduated high	6	145.69	1.82	150.63	1.58	4.94	0.30		3.30	2.49	5.79	0.35			
	Some educatio	7	154.54	1.67	159.53	1.64	4.99	0.35		2.80	2.68	5.47	0.38			
	Graduated colle	36	161.33	0.95	169.11	1.07	7.79	2.80		0.91	1.14	2.05	0.74			
	Unknown	2	132.98	2.49	138.04	2.66	5.05	0.10		6.22	7.09	13.30	0.27			
Information no	Did not finish h	0	‡	†	‡	†										
	Graduated high	0	‡	†	‡	†										
	Some educatio	1	‡	†	159.79	3.63					13.19					
	Graduated colle	4	163.29	3.43	169.36	3.11	6.07	0.24		11.76	9.64	21.40	0.86			
	Unknown	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by ask students to use computer to complete writing started by hand (collapsed) [T118402], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year igibility, 3 categories es, student-reported			Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	139	(1.3)	146	(1.1)
			Black	123	(1.3)	129	(1.7)
			Hispanic	127	(1.0)	136	(1.0)
			Asian	144	(3.5)	155	(3.9)
			Indian/Alaska Native	‡	†	‡	†
			Other Pacific Islander	‡	†	‡	†
			Two or more races	140	(2.1)	143	(2.1)
		Not eligible	White	160	(0.9)	167	(1.2)
			Black	143	(2.0)	146	(2.0)
			Hispanic	147	(1.6)	155	(1.3)
			Asian	169	(2.8)	176	(2.8)
			Indian/Alaska Native	‡	†	‡	†
			Other Pacific Islander	‡	†	‡	†
			Two or more races	156	(2.0)	164	(2.3)
		mation not available	White	165	(3.9)	169	(3.5)
			Black	‡	†	‡	†
			Hispanic	141	(3.9)	161	(4.7)
			Asian	‡	†	‡	†
			Indian/Alaska Native	‡	†	‡	†
			Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.88	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.78	3.15	0.002
Eligible	White	13	139.31	1.28	145.86	1.14	6.55	0.85		1.65	1.31	2.96	0.38			
	Black	8	123.35	1.28	129.28	1.71	5.94	0.47		1.64	2.91	4.55	0.36			
	Hispanic	16	127.45	1.03	135.60	0.99	8.15	1.30		1.06	0.98	2.04	0.33			
	Asian	1	143.78	3.55	155.21	3.86	11.43	0.11		12.59	14.89	27.48	0.27			
	American Indian/	0	‡	†	‡	†										
	Native Hawaiian/	0	‡	†	‡	†										
	Two or more race	3	140.03	2.15	143.36	2.07	3.33	0.10		4.62	4.30	8.92	0.27			
Not eligible	White	35	159.52	0.93	166.94	1.18	7.41	2.59		0.86	1.38	2.24	0.78			
	Black	3	143.40	2.02	145.60	1.95	2.20	0.07		4.09	3.81	7.91	0.24			
	Hispanic	8	146.50	1.56	154.93	1.29	8.42	0.67		2.44	1.67	4.11	0.33			
	Asian	2	168.71	2.84	176.46	2.81	7.74	0.15		8.06	7.90	15.96	0.32			
	American Indian/	0	‡	†	‡	†										
	Native Hawaiian/	0	‡	†	‡	†										
	Two or more race	3	155.84	2.00	163.77	2.32	7.94	0.24		4.01	5.37	9.38	0.28			
Information not	White	3	165.24	3.93	168.77	3.53	3.52	0.11		15.47	12.48	27.95	0.84			
	Black	0	‡	†	‡	†										
	Hispanic	1	140.93	3.85	160.82	4.71	19.89	0.20		14.85	22.19	37.04	0.37			
	Asian	0	‡	†	‡	†										
	American Indian/	0	‡	†	‡	†										
	Native Hawaiian/	0	‡	†	‡	†										
	Two or more race	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by ask students to use computer to complete writing started by hand (collapsed) [T118402], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

			low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	ocation, 4 categories vel, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City ot finish high school	126	(1.8)	136	(2.5)
		raduated high school	128	(1.7)	136	(1.8)
		ion after high school	141	(1.7)	149	(1.9)
		Graduated college	150	(2.1)	161	(1.8)
		Unknown	115	(2.0)	127	(2.4)
		Suburb ot finish high school	133	(2.4)	139	(2.2)
		raduated high school	135	(1.5)	147	(1.6)
		ion after high school	146	(1.9)	154	(1.9)
		Graduated college	159	(1.7)	169	(1.4)
		Unknown	124	(2.4)	133	(2.4)
		Town ot finish high school	130	(3.0)	‡	†
		raduated high school	136	(3.2)	142	(3.1)
		ion after high school	154	(3.0)	156	(2.5)
		Graduated college	152	(1.8)	160	(2.1)
		Unknown	117	(5.1)	126	(2.9)
		Rural ot finish high school	133	(3.7)	140	(2.7)
		raduated high school	138	(2.3)	143	(2.5)
		ion after high school	148	(2.2)	156	(2.2)
		Graduated college	153	(1.7)	162	(2.1)
		Unknown	124	(2.7)	131	(3.3)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.80	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.19	3.08	0.002
City	Did not finish hig	3	125.65	1.81	135.75	2.49	10.09	0.30		3.27	6.22	9.49	0.28			
	Graduated high s	4	127.69	1.66	136.41	1.78	8.72	0.35		2.74	3.16	5.91	0.24			
	Some education	4	140.89	1.72	149.16	1.85	8.27	0.33		2.94	3.43	6.37	0.25			
	Graduated colleg	13	150.47	2.06	160.56	1.77	10.10	1.31		4.24	3.12	7.37	0.96			
	Unknown	3	115.30	2.02	126.68	2.43	11.38	0.34		4.06	5.90	9.97	0.30			
Suburb	Did not finish hig	2	133.42	2.42	139.18	2.22	5.76	0.12		5.86	4.91	10.77	0.22			
	Graduated high s	5	134.94	1.45	147.02	1.65	12.08	0.60		2.11	2.71	4.82	0.24			
	Some education	6	145.69	1.88	154.37	1.95	8.69	0.52		3.52	3.78	7.31	0.44			
	Graduated colleg	22	159.11	1.74	168.51	1.39	9.40	2.07		3.03	1.95	4.97	1.09			
	Unknown	3	123.69	2.40	133.21	2.38	9.52	0.29		5.74	5.66	11.41	0.34			
Town	Did not finish hig	1	129.70	2.98	‡	†				8.87						
	Graduated high s	2	136.08	3.23	141.85	3.11	5.77	0.12		10.45	9.65	20.10	0.40			
	Some education	2	154.40	3.00	155.70	2.45	1.30	0.03		8.97	6.01	14.98	0.30			
	Graduated colleg	6	152.12	1.81	160.01	2.13	7.89	0.47		3.29	4.55	7.84	0.47			
	Unknown	1	116.76	5.08	126.21	2.86	9.45	0.09		25.82	8.16	33.97	0.34			
Rural	Did not finish hig	1	133.28	3.73	139.80	2.71	6.53	0.07		13.90	7.32	21.23	0.21			
	Graduated high s	4	138.03	2.31	142.67	2.50	4.65	0.19		5.35	6.24	11.59	0.46			
	Some education	4	147.64	2.25	155.58	2.24	7.94	0.32		5.05	5.00	10.05	0.40			
	Graduated colleg	12	152.74	1.74	162.37	2.05	9.63	1.16		3.03	4.22	7.24	0.87			
	Unknown	2	123.82	2.74	130.78	3.27	6.95	0.14		7.48	10.72	18.20	0.36			

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Average scale scores for writing, grade 8 by ask students to use computer to complete writing started by hand (collapsed) [T118402], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year cation, 4 categories s, student-reported			Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	154	(2.3)	163	(2.0)
			Black	125	(2.0)	131	(2.8)
			Hispanic	129	(1.5)	142	(1.9)
			Asian	153	(4.4)	166	(2.5)
			ndian/Alaska Native	‡	†	‡	†
			ther Pacific Islander	‡	†	‡	†
			Two or more races	146	(2.5)	151	(3.1)
		Suburb	White	159	(1.8)	167	(1.5)
			Black	132	(2.0)	140	(2.5)
			Hispanic	135	(1.8)	146	(1.5)
			Asian	165	(4.6)	178	(2.9)
			ndian/Alaska Native	‡	†	‡	†
			ther Pacific Islander	‡	†	‡	†
			Two or more races	152	(2.9)	158	(2.9)
		Town	White	150	(2.4)	157	(1.7)
			Black	130	(4.5)	†	†
			Hispanic	131	(2.7)	144	(2.4)
			Asian	†	†	‡	†
			ndian/Alaska Native	‡	†	‡	†
			ther Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Rural	White	150	(1.5)	158	(1.9)
			Black	130	(4.1)	137	(3.2)
			Hispanic	137	(1.8)	146	(2.3)
			Asian	‡	†	‡	†
			ndian/Alaska Native	‡	†	‡	†
			ther Pacific Islander	‡	†	‡	†
			Two or more races	144	(2.6)	154	(4.0)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.74	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.84	**2.94**	**0.003**
City	White	9	154.50	2.25	163.47	1.96	8.97	0.81		5.08	3.85	8.93	0.80			
	Black	5	125.38	1.97	130.89	2.79	5.50	0.28		3.89	7.80	11.68	0.58			
	Hispanic	10	129.45	1.50	141.83	1.94	12.39	1.24		2.26	3.76	6.02	0.60			
	Asian	2	152.58	4.43	166.10	2.51	13.52	0.27		19.65	6.30	25.95	0.52			
	American Indian	0	‡	†	‡	†										
	Native Hawaiian	0	‡	†	‡	†										
	Two or more rac	2	145.54	2.47	150.98	3.10	5.44	0.11		6.09	9.58	15.67	0.31			
Suburb	White	20	159.19	1.82	167.04	1.50	7.85	1.57		3.33	2.24	5.57	1.11			
	Black	4	131.67	2.01	139.86	2.47	8.20	0.33		4.02	6.12	10.15	0.41			
	Hispanic	10	134.74	1.75	145.68	1.50	10.94	1.09		3.07	2.25	5.32	0.53			
	Asian	2	164.76	4.61	177.93	2.94	13.17	0.26		21.27	8.64	29.91	0.60			
	American Indian	0	‡	†	‡	†										
	Native Hawaiian	0	‡	†	‡	†										
	Two or more rac	3	152.17	2.87	158.37	2.92	6.20	0.19		8.21	8.55	16.77	0.50			
Town	White	8	150.32	2.42	156.90	1.69	6.59	0.53		5.88	2.87	8.75	0.70			
	Black	1	129.53	4.45	‡	†				19.81						
	Hispanic	2	131.29	2.66	143.63	2.35	12.35	0.25		7.10	5.53	12.63	0.25			
	Asian	0	‡	†	‡	†										
	American Indian	0	‡	†	‡	†										
	Native Hawaiian	0	‡	†	‡	†										
	Two or more rac	1	‡	†	‡	†										
Rural	White	15	149.81	1.53	158.46	1.86	8.65	1.30		2.35	3.45	5.80	0.87			
	Black	2	130.17	4.13	137.08	3.25	6.91	0.14		17.07	10.55	27.61	0.55			
	Hispanic	3	136.78	1.84	146.25	2.27	9.46	0.28		3.38	5.16	8.53	0.26			
	Asian	0	‡	†	‡	†										
	American Indian	0	‡	†	‡	†										
	Native Hawaiian	0	‡	†	‡	†										
	Two or more rac	1	144.22	2.62	154.24	4.02	10.02	0.10		6.89	16.14	23.03	0.23			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to complete writing started by hand (collapsed) [T118402], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

			low use (collapsed)		high use (collapsed)	
Jurisdiction	Year level, from 2 questions	lines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011 3 not finish high school	White	135	(2.7)	145	(2.8)
		Black	112	(4.0)	120	(4.1)
		Hispanic	129	(1.5)	136	(1.5)
		Asian	‡	†	‡	†
		n Indian/Alaska Native	‡	†	‡	†
		r/Other Pacific Islander	‡	†	‡	†
		Two or more races	‡	†	‡	†
	Graduated high school	White	143	(1.9)	148	(1.6)
		Black	122	(2.1)	126	(2.0)
		Hispanic	129	(1.6)	139	(2.0)
		Asian	‡	†	‡	†
		n Indian/Alaska Native	‡	†	‡	†
		r/Other Pacific Islander	‡	†	‡	†
		Two or more races	139	(4.8)	142	(3.3)
	ation after high school	White	154	(1.5)	159	(1.4)
		Black	134	(2.1)	141	(2.8)
		Hispanic	141	(1.8)	148	(2.0)
		Asian	‡	†	‡	†
		n Indian/Alaska Native	‡	†	‡	†
		r/Other Pacific Islander	‡	†	‡	†
		Two or more races	148	(2.9)	153	(3.6)
	Graduated college	White	161	(1.1)	169	(1.1)
		Black	135	(1.5)	142	(2.0)
		Hispanic	145	(1.4)	155	(1.4)
		Asian	167	(3.0)	175	(2.1)
		n Indian/Alaska Native	‡	†	‡	†
		r/Other Pacific Islander	‡	†	‡	†
		Two or more races	154	(2.0)	161	(2.0)
	Unknown	White	128	(3.1)	134	(2.3)
		Black	112	(3.1)	119	(4.2)
		Hispanic	115	(1.6)	125	(1.7)
		Asian	‡	†	156	(5.7)
		n Indian/Alaska Native	‡	†	‡	†
		r/Other Pacific Islander	‡	†	‡	†
		Two or more races	129	(4.3)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.46	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.22	2.99	0.003
Did not finish high	White	2	134.72	2.75	144.70	2.83	9.98	0.20		7.56	8.01	15.56	0.31			
	Black	1	111.55	4.01	120.45	4.05	8.90	0.09		16.11	16.43	32.54	0.33			
	Hispanic	4	129.49	1.47	136.07	1.54	6.58	0.26		2.16	2.38	4.54	0.18			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										
Graduated high sc	White	7	142.85	1.93	148.21	1.58	5.36	0.37		3.71	2.50	6.22	0.44			
	Black	2	122.40	2.15	125.54	2.03	3.13	0.06		4.62	4.13	8.75	0.18			
	Hispanic	5	128.86	1.57	139.08	2.00	10.22	0.51		2.48	4.02	6.50	0.32			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	139.33	4.80	141.57	3.30	2.25	0.02		23.05	10.86	33.91	0.34			
Some education af	White	7	153.51	1.52	158.53	1.41	5.02	0.35		2.33	1.99	4.31	0.30			
	Black	2	134.06	2.06	140.52	2.82	6.45	0.13		4.25	7.97	12.22	0.24			
	Hispanic	4	141.04	1.75	148.18	2.04	7.13	0.29		3.07	4.16	7.23	0.29			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	147.67	2.91	153.32	3.64	5.64	0.06		8.48	13.23	21.71	0.22			
Graduated college	White	33	160.88	1.08	169.07	1.11	8.18	2.70		1.16	1.23	2.40	0.79			
	Black	5	135.23	1.52	141.73	1.99	6.50	0.32		2.31	3.98	6.29	0.31			
	Hispanic	8	144.55	1.40	155.34	1.45	10.79	0.86		1.96	2.09	4.05	0.32			
	Asian	3	167.25	2.96	175.17	2.06	7.92	0.24		8.79	4.24	13.03	0.39			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	4	153.75	2.00	161.30	2.00	7.55	0.30		3.99	4.02	8.00	0.32			
Unknown	White	3	128.06	3.14	134.36	2.26	6.31	0.19		9.85	5.09	14.94	0.45			
	Black	1	111.71	3.11	118.73	4.18	7.02	0.07		9.66	17.47	27.13	0.27			
	Hispanic	4	114.66	1.56	125.26	1.73	10.60	0.42		2.45	2.99	5.44	0.22			
	Asian	0	‡	†	155.90	5.71					32.57					
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	129.48	4.33	‡	†				18.79						

Appendix C.9

Draft and Revise Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to draft and revise writing (collapsed) [T118401], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	low use (collapsed)		high use (collapsed)	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	122	(0.8)	130	(1.1)
			Not eligible	147	(1.0)	156	(1.2)
			Information not available	149	(3.7)	159	(4.1)
		Female	Eligible	142	(0.7)	149	(1.2)
			Not eligible	167	(0.9)	175	(1.2)
			Information not available	165	(3.6)	176	(4.1)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR					VARIANCE OF EFFECT	*test statistic*	*p*
Gender	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.22	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means		3.89	4.17	0.000
Male	Eligible	21	122.19	0.81	130.11	1.13	7.92	1.66		0.66	1.27	1.92	0.40				
	Not eligible	27	146.76	1.02	155.78	1.23	9.02	2.43		1.05	1.52	2.57	0.69				
	Information not av	3	149.31	3.70	158.56	4.06	9.25	0.28		13.69	16.50	30.19	0.91				
Female	Eligible	21	141.93	0.71	148.90	1.17	6.98	1.47		0.51	1.37	1.87	0.39				
	Not eligible	26	167.34	0.87	175.30	1.22	7.96	2.07		0.75	1.49	2.24	0.58				
	Information not av	3	165.48	3.63	175.77	4.15	10.28	0.31		13.16	17.21	30.37	0.91				

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to draft and revise writing (collapsed) [T118401], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	129	(1.3)	144	(2.0)
			Suburb	139	(1.6)	152	(1.6)
			Town	135	(1.9)	142	(4.0)
			Rural	136	(1.7)	147	(1.7)
		Female	City	147	(1.4)	161	(1.8)
			Suburb	159	(1.6)	171	(1.8)
			Town	157	(1.9)	162	(2.0)
			Rural	156	(1.6)	168	(1.8)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	12.08	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.65	**4.69**	**0.000**
Male	City	14	128.74	1.30	144.46	1.96	15.72	2.20		1.68	3.83	5.51	0.77			
	Suburb	19	139.14	1.64	151.58	1.62	12.44	2.36		2.70	2.63	5.33	1.01			
	Town	6	134.66	1.93	142.39	4.05	7.73	0.46		3.73	16.40	20.13	1.21			
	Rural	12	136.13	1.71	146.79	1.72	10.66	1.28		2.93	2.96	5.89	0.71			
Female	City	14	146.82	1.36	161.29	1.83	14.47	2.03		1.84	3.34	5.18	0.73			
	Suburb	19	159.17	1.58	170.55	1.84	11.38	2.16		2.49	3.38	5.87	1.11			
	Town	6	157.29	1.93	161.92	1.98	4.63	0.28		3.73	3.91	7.64	0.46			
	Rural	11	155.65	1.64	167.56	1.80	11.91	1.31		2.70	3.25	5.95	0.65			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to draft and revise writing (collapsed) [T118401], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	122	(1.5)	127	(2.1)
			Graduated high school	125	(1.4)	134	(1.7)
			Some education after high school	136	(1.4)	142	(1.8)
			Graduated college	145	(1.1)	157	(1.2)
			Unknown	112	(1.4)	122	(1.9)
		Female	Did not finish high school	139	(1.7)	146	(2.1)
			Graduated high school	146	(1.0)	152	(1.4)
			Some education after high school	158	(1.1)	164	(1.6)
			Graduated college	165	(0.9)	176	(1.2)
			Unknown	131	(1.4)	141	(2.2)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.37	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.61	**4.93**	**0.000**
Male	Did not finish high	3	121.58	1.46	127.36	2.12	5.78	0.17		2.13	4.50	6.63	0.20			
	Graduated high sc	8	125.26	1.45	133.63	1.70	8.37	0.67		2.09	2.89	4.98	0.40			
	Some education a	7	136.20	1.37	142.16	1.77	5.95	0.42		1.89	3.12	5.01	0.35			
	Graduated college	27	145.21	1.05	157.05	1.24	11.85	3.20		1.11	1.54	2.65	0.71			
	Unknown	5	112.03	1.42	122.06	1.89	10.03	0.50		2.03	3.58	5.61	0.28			
Female	Did not finish high	4	138.99	1.71	146.45	2.09	7.46	0.30		2.91	4.36	7.27	0.29			
	Graduated high sc	8	145.96	1.02	152.12	1.45	6.16	0.49		1.05	2.09	3.14	0.25			
	Some education a	8	157.88	1.13	164.18	1.57	6.31	0.50		1.27	2.47	3.74	0.30			
	Graduated college	26	165.04	0.86	175.52	1.18	10.47	2.72		0.73	1.39	2.12	0.55			
	Unknown	4	131.38	1.41	141.23	2.21	9.85	0.39		1.99	4.87	6.86	0.27			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to draft and revise writing (collapsed) [T118401], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	144	(1.2)	155	(1.4)
			Black	120	(1.3)	130	(2.0)
			Hispanic	124	(1.1)	136	(1.3)
			Asian	151	(3.7)	162	(2.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	136	(2.0)	147	(2.3)
		Female	White	164	(0.9)	174	(1.2)
			Black	139	(1.4)	144	(2.6)
			Hispanic	143	(0.9)	154	(1.5)
			Asian	171	(2.1)	178	(2.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	159	(1.7)	165	(2.3)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.57	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.23	**4.65**	**0.000**
Male	White	26	144.29	1.18	154.52	1.36	10.23	2.66		1.39	1.84	3.23	0.84			
	Black	6	120.30	1.29	129.59	2.03	9.29	0.56		1.67	4.11	5.78	0.35			
	Hispanic	13	124.41	1.07	135.70	1.29	11.28	1.47		1.15	1.67	2.81	0.37			
	Asian	2	151.16	3.72	162.39	2.94	11.23	0.22		13.85	8.65	22.50	0.45			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	3	136.49	2.01	147.14	2.28	10.65	0.32		4.06	5.19	9.25	0.28			
Female	White	25	164.35	0.94	174.17	1.16	9.82	2.46		0.88	1.34	2.22	0.56			
	Black	6	138.74	1.40	143.77	2.59	5.03	0.30		1.97	6.69	8.66	0.52			
	Hispanic	12	143.46	0.86	154.04	1.53	10.59	1.27		0.74	2.34	3.08	0.37			
	Asian	2	171.05	2.13	177.83	2.89	6.78	0.14		4.56	8.33	12.88	0.26			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	3	159.39	1.68	165.36	2.33	5.97	0.18		2.82	5.42	8.24	0.25			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to draft and revise writing (collapsed) [T118401], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	128	(1.1)	135	(1.8)
			Suburb	134	(1.4)	141	(1.2)
			Town	135	(2.2)	140	(2.4)
			Rural	134	(1.5)	143	(1.8)
		Not eligible	City	154	(1.5)	164	(1.9)
			Suburb	160	(1.5)	168	(1.7)
			Town	155	(2.4)	159	(2.4)
			Rural	154	(1.4)	164	(1.8)
		Information not available	City	157	(4.2)	170	(5.6)
			Suburb	158	(7.8)	168	(6.1)
			Town	‡	†	‡	†
			Rural	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.82	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.16	**2.74**	**0.006**
Eligible	City	15	127.53	1.08	135.27	1.83	7.74	1.16		1.17	3.35	4.53	0.68			
	Suburb	13	134.16	1.37	141.36	1.17	7.20	0.94		1.87	1.36	3.23	0.42			
	Town	5	135.30	2.23	139.72	2.40	4.42	0.22		4.96	5.77	10.74	0.54			
	Rural	9	134.48	1.50	143.33	1.78	8.86	0.80		2.26	3.15	5.41	0.49			
Not eligibl	City	10	154.31	1.53	164.02	1.85	9.71	0.97		2.34	3.43	5.77	0.58			
	Suburb	23	160.41	1.49	168.19	1.70	7.79	1.79		2.22	2.90	5.11	1.18			
	Town	6	154.75	2.37	158.83	2.39	4.08	0.24		5.60	5.73	11.33	0.68			
	Rural	13	154.23	1.40	163.73	1.80	9.49	1.23		1.95	3.26	5.21	0.68			
Informatio	City	2	156.61	4.20	170.11	5.58	13.50	0.27		17.60	31.10	48.71	0.97			
	Suburb	2	157.64	7.80	167.55	6.06	9.90	0.20		60.88	36.76	97.65	1.95			
	Town	1	‡	†	‡	†										
	Rural	1	‡	†	‡	†										

National Center for Education Statistics (NCES)
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National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to draft and revise writing (collapsed) [T118401], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	129	(1.4)	136	(1.5)
			Graduated high school	130	(1.1)	135	(1.5)
			Some education after high school	141	(1.1)	146	(1.6)
			Graduated college	138	(0.9)	147	(1.5)
			Unknown	117	(1.3)	126	(1.6)
		Not eligible	Did not finish high school	142	(2.7)	144	(3.8)
			Graduated high school	147	(1.7)	150	(1.8)
			Some education after high school	155	(1.6)	160	(1.7)
			Graduated college	162	(0.9)	170	(1.2)
			Unknown	132	(2.3)	140	(2.8)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	‡	†	‡	†
			Some education after high school	‡	†	160	(4.3)
			Graduated college	163	(3.3)	170	(3.5)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.18	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.49	**3.39**	**0.001**
Eligible	Did not finish high	6	129.27	1.36	135.89	1.53	6.62	0.40		1.86	2.33	4.18	0.25			
	Graduated high sc	10	129.61	1.08	135.25	1.47	5.64	0.56		1.16	2.16	3.32	0.33			
	Some education af	8	141.43	1.06	145.55	1.55	4.12	0.33		1.13	2.42	3.55	0.28			
	Graduated college	13	137.73	0.89	147.02	1.45	9.29	1.21		0.79	2.11	2.90	0.38			
	Unknown	6	116.61	1.31	125.84	1.61	9.23	0.55		1.71	2.59	4.30	0.26			
Not eligibl	Did not finish high	1	142.05	2.72	144.39	3.79	2.33	0.02		7.41	14.40	21.81	0.22			
	Graduated high sc	6	147.01	1.73	150.46	1.78	3.45	0.21		3.00	3.17	6.18	0.37			
	Some education af	7	155.23	1.56	160.05	1.74	4.82	0.34		2.44	3.02	5.45	0.38			
	Graduated college	36	161.66	0.94	170.31	1.20	8.65	3.11		0.88	1.43	2.31	0.83			
	Unknown	2	132.09	2.32	139.92	2.77	7.83	0.16		5.40	7.67	13.06	0.26			
Informatio	Did not finish high	0	‡	†	‡	†										
	Graduated high sc	0	‡	†	‡	†										
	Some education af	1	‡	†	159.83	4.28					18.30					
	Graduated college	4	162.58	3.30	169.94	3.50	7.36	0.29		10.92	12.28	23.20	0.93			
	Unknown	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
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This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by ask students to use computer to draft and revise writing (collapsed) [T118401], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	140	(1.2)	147	(1.1)
			Black	124	(1.3)	130	(2.0)
			Hispanic	128	(0.9)	136	(1.0)
			Asian	150	(3.2)	150	(4.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	140	(1.9)	144	(2.5)
		Not eligible	White	160	(0.9)	168	(1.3)
			Black	143	(1.7)	147	(2.4)
			Hispanic	148	(1.4)	155	(1.5)
			Asian	170	(3.3)	177	(2.4)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	157	(2.1)	164	(2.4)
		Information not available	White	163	(4.1)	171	(3.4)
			Black	‡	†	‡	†
			Hispanic	142	(6.0)	160	(5.3)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.11	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.29	**3.09**	**0.002**
Eligible	White	13	139.96	1.25	146.80	1.15	6.84	0.89		1.56	1.31	2.87	0.37			
	Black	8	123.96	1.31	130.06	1.98	6.10	0.49		1.71	3.91	5.61	0.45			
	Hispanic	16	128.24	0.90	136.03	1.02	7.79	1.25		0.81	1.03	1.85	0.30			
	Asian	1	149.51	3.21	150.33	4.10	0.82	0.01		10.31	16.78	27.09	0.27			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	3	139.95	1.92	144.44	2.48	4.49	0.13		3.68	6.17	9.85	0.30			
Not eligible	White	35	159.84	0.93	168.17	1.29	8.34	2.92		0.87	1.68	2.54	0.89			
	Black	3	142.60	1.68	147.40	2.40	4.81	0.14		2.82	5.75	8.56	0.26			
	Hispanic	8	148.29	1.39	154.73	1.47	6.45	0.52		1.93	2.17	4.11	0.33			
	Asian	2	169.83	3.28	176.91	2.42	7.08	0.14		10.73	5.87	16.61	0.33			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	3	157.03	2.07	164.22	2.36	7.19	0.22		4.30	5.58	9.88	0.30			
Informatio	White	3	162.92	4.09	170.78	3.43	7.86	0.24		16.74	11.75	28.48	0.85			
	Black	0	‡	†	‡	†										
	Hispanic	1	142.07	6.01	159.65	5.31	17.57	0.18		36.17	28.19	64.36	0.64			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/C	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
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Average scale scores for writing, grade 8 by ask students to use computer to draft and revise writing (collapsed) [T118401], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	127	(1.8)	135	(2.9)
			Graduated high school	129	(1.5)	137	(1.9)
			Some education after high school	143	(1.7)	148	(2.0)
			Graduated college	149	(1.3)	164	(1.8)
			Unknown	116	(1.9)	129	(2.8)
		Suburb	Did not finish high school	134	(2.1)	139	(2.4)
			Graduated high school	138	(1.5)	145	(1.9)
			Some education after high school	146	(2.1)	156	(2.0)
			Graduated college	160	(1.6)	169	(1.6)
			Unknown	125	(2.2)	134	(2.9)
		Town	Did not finish high school	135	(6.3)	‡	†
			Graduated high school	136	(3.1)	144	(3.3)
			Some education after high school	156	(2.3)	154	(2.9)
			Graduated college	153	(1.9)	160	(2.2)
			Unknown	119	(5.0)	125	(3.2)
		Rural	Did not finish high school	133	(3.6)	143	(2.7)
			Graduated high school	138	(2.1)	143	(2.6)
			Some education after high school	148	(2.1)	157	(3.0)
			Graduated college	153	(1.7)	164	(2.0)
			Unknown	123	(2.5)	134	(3.0)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.19	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.22	**3.21**	**0.001**
City	Did not finish high	3	127.48	1.78	134.88	2.93	7.39	0.22		3.18	8.61	11.79	0.35			
	Graduated high sc	4	129.00	1.53	136.77	1.86	7.77	0.31		2.35	3.47	5.83	0.23			
	Some education af	4	143.19	1.72	147.81	2.01	4.62	0.18		2.96	4.06	7.02	0.28			
	Graduated college	13	148.66	1.32	164.35	1.80	15.69	2.04		1.75	3.24	4.99	0.65			
	Unknown	3	116.12	1.89	128.59	2.78	12.47	0.37		3.56	7.71	11.27	0.34			
Suburb	Did not finish high	2	134.12	2.06	139.05	2.40	4.93	0.10		4.23	5.77	10.00	0.20			
	Graduated high sc	5	138.48	1.52	145.33	1.87	6.85	0.34		2.32	3.51	5.83	0.29			
	Some education af	6	146.16	2.07	156.19	1.95	10.03	0.60		4.27	3.81	8.09	0.49			
	Graduated college	22	160.26	1.59	169.29	1.61	9.03	1.99		2.54	2.61	5.15	1.13			
	Unknown	3	124.86	2.22	134.13	2.86	9.27	0.28		4.92	8.17	13.10	0.39			
Town	Did not finish high	1	135.20	6.28	‡	†				39.44						
	Graduated high sc	2	136.09	3.11	143.72	3.26	7.63	0.15		9.69	10.61	20.30	0.41			
	Some education af	2	155.61	2.28	154.13	2.87	-1.48	-0.03		5.18	8.24	13.42	0.27			
	Graduated college	6	153.06	1.90	159.80	2.17	6.74	0.40		3.59	4.70	8.30	0.50			
	Unknown	1	119.02	5.02	124.68	3.25	5.66	0.06		25.21	10.56	35.78	0.36			
Rural	Did not finish high	1	132.84	3.61	142.86	2.71	10.02	0.10		13.00	7.34	20.34	0.20			
	Graduated high sc	4	138.47	2.13	143.27	2.59	4.80	0.19		4.55	6.72	11.27	0.45			
	Some education af	4	148.00	2.10	156.83	3.03	8.83	0.35		4.39	9.21	13.60	0.54			
	Graduated college	12	153.29	1.65	164.06	2.02	10.76	1.29		2.72	4.09	6.81	0.82			
	Unknown	2	122.76	2.54	134.18	3.04	11.42	0.23		6.45	9.27	15.72	0.31			

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Average scale scores for writing, grade 8 by ask students to use computer to draft and revise writing (collapsed) [T118401], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	154	(1.8)	166	(2.0)
			Black	126	(1.9)	132	(3.3)
			Hispanic	130	(1.5)	144	(2.1)
			Asian	155	(3.2)	165	(2.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	144	(2.2)	154	(2.9)
		Suburb	White	159	(1.8)	169	(1.8)
			Black	133	(2.1)	140	(2.2)
			Hispanic	136	(1.6)	145	(1.8)
			Asian	170	(3.5)	177	(3.6)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	153	(2.6)	159	(3.3)
		Town	White	152	(2.3)	156	(1.6)
			Black	130	(4.2)	‡	†
			Hispanic	134	(2.5)	143	(3.7)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	148	(3.9)	‡	†
		Rural	White	150	(1.6)	160	(1.8)
			Black	129	(3.7)	143	(3.5)
			Hispanic	138	(1.8)	146	(2.6)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	146	(2.7)	154	(4.6)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.16	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.91	3.07	0.002
City	White	9	153.65	1.78	166.33	2.01	12.68	1.14		3.18	4.04	7.22	0.65			
	Black	5	125.85	1.87	131.91	3.27	6.07	0.30		3.51	10.68	14.20	0.71			
	Hispanic	10	130.10	1.46	143.64	2.07	13.54	1.35		2.13	4.27	6.40	0.64			
	Asian	2	154.98	3.22	165.13	2.94	10.15	0.20		10.39	8.65	19.04	0.38			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	2	144.00	2.24	154.17	2.93	10.17	0.20		5.00	8.56	13.56	0.27			
Suburb	White	20	159.27	1.84	168.62	1.82	9.35	1.87		3.37	3.30	6.68	1.34			
	Black	4	133.21	2.14	139.98	2.18	6.77	0.27		4.59	4.77	9.36	0.37			
	Hispanic	10	136.49	1.59	145.31	1.77	8.82	0.88		2.52	3.13	5.65	0.57			
	Asian	2	169.73	3.49	176.66	3.55	6.93	0.14		12.20	12.61	24.82	0.50			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	3	153.24	2.59	158.58	3.27	5.34	0.16		6.72	10.71	17.43	0.52			
Town	White	8	151.68	2.31	156.16	1.62	4.49	0.36		5.34	2.63	7.97	0.64			
	Black	1	130.26	4.21	‡	†				17.68						
	Hispanic	2	133.56	2.52	142.89	3.65	9.33	0.19		6.36	13.35	19.71	0.39			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	147.70	3.90	‡	†				15.24						
Rural	White	15	150.19	1.56	160.11	1.81	9.92	1.49		2.44	3.29	5.73	0.86			
	Black	2	128.87	3.66	142.65	3.50	13.78	0.28		13.39	12.28	25.67	0.51			
	Hispanic	3	137.98	1.76	146.23	2.57	8.25	0.25		3.11	6.61	9.72	0.29			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	146.22	2.72	153.94	4.42	7.72	0.08		7.39	19.55	26.95	0.27			

National Center for Education Statistics (NCES)
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Average scale scores for writing, grade 8 by ask students to use computer to draft and revise writing (collapsed) [T118401], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

			low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	136	(3.0)	145	(2.6)
			Black	114	(3.2)	‡	†
			Hispanic	131	(1.3)	135	(1.6)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	144	(1.8)	148	(1.6)
			Black	124	(2.2)	124	(2.4)
			Hispanic	130	(1.5)	139	(2.2)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	139	(4.0)	142	(3.9)
		Some education after high school	White	154	(1.5)	160	(1.6)
			Black	135	(2.0)	141	(3.4)
			Hispanic	142	(1.6)	148	(2.1)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(3.2)	153	(3.9)
		Graduated college	White	161	(1.0)	170	(1.2)
			Black	135	(1.5)	144	(2.1)
			Hispanic	145	(1.4)	156	(1.8)
			Asian	168	(2.7)	176	(2.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	154	(2.0)	163	(2.1)
		Unknown	White	128	(2.6)	136	(2.6)
			Black	112	(2.7)	121	(4.9)
			Hispanic	116	(1.6)	126	(1.8)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	128	(3.9)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin, The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.63	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.19	3.07	0.002
Did not fin	White	2	136.34	3.03	144.76	2.63	8.42	0.17		9.17	6.94	16.11	0.32			
	Black	1	113.99	3.16	‡	†				10.02						
	Hispanic	4	130.93	1.27	134.87	1.62	3.94	0.16		1.61	2.63	4.24	0.17			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	‡	†	‡	†										
Graduated	White	7	144.21	1.77	148.16	1.64	3.96	0.28		3.13	2.67	5.81	0.41			
	Black	2	123.66	2.16	123.50	2.42	-0.15	0.00		4.65	5.85	10.50	0.21			
	Hispanic	5	129.85	1.47	139.17	2.20	9.33	0.47		2.16	4.82	6.98	0.35			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	139.10	4.02	142.37	3.91	3.27	0.03		16.17	15.30	31.47	0.31			
Some edu	White	7	153.65	1.53	159.63	1.59	5.99	0.42		2.34	2.53	4.88	0.34			
	Black	2	134.66	1.95	140.96	3.37	6.30	0.13		3.82	11.36	15.18	0.30			
	Hispanic	4	142.46	1.59	147.86	2.08	5.40	0.22		2.54	4.33	6.87	0.27			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	1	148.64	3.18	153.27	3.85	4.63	0.05		10.14	14.84	24.98	0.25			
Graduated	White	33	161.07	1.04	170.35	1.21	9.28	3.06		1.09	1.46	2.55	0.84			
	Black	5	135.16	1.47	143.98	2.12	8.82	0.44		2.16	4.50	6.66	0.33			
	Hispanic	8	145.36	1.43	156.40	1.80	11.04	0.88		2.06	3.23	5.29	0.42			
	Asian	3	167.65	2.65	175.59	2.14	7.94	0.24		7.05	4.60	11.65	0.35			
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	4	154.12	2.00	162.92	2.13	8.80	0.35		4.00	4.53	8.53	0.34			
Unknown	White	3	128.16	2.59	136.05	2.63	7.89	0.24		6.70	6.93	13.63	0.41			
	Black	1	112.05	2.69	120.92	4.92	8.87	0.09		7.26	24.24	31.50	0.32			
	Hispanic	4	115.53	1.56	125.96	1.83	10.43	0.42		2.43	3.37	5.80	0.23			
	Asian	0	‡	†	‡	†										
	American Indian/A	0	‡	†	‡	†										
	Native Hawaiian/O	0	‡	†	‡	†										
	Two or more races	0	128.50	3.93	‡	†				15.42						

Appendix C.10

Writing for School Assignments Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer for writing for school assignments (collapsed) [W810201], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	low use (collapsed)		high use (collapsed)	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	124	(0.7)	128	(1.1)
			Not eligible	148	(0.9)	158	(1.2)
			Information not available	147	(3.0)	162	(3.4)
		Female	Eligible	143	(0.8)	147	(0.9)
			Not eligible	167	(0.8)	177	(1.2)
			Information not available	161	(3.0)	180	(2.9)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANC	test	p
	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.91	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	2.95	4.60	0.000
Gender																
Male	Eligible	21	124.09	0.72	127.82	1.09	3.72	0.78		0.51	1.19	1.70	0.36			
	Not eligible	27	147.76	0.92	157.70	1.21	9.94	2.68		0.85	1.47	2.32	0.63			
	Information not available	3	146.98	2.96	161.65	3.38	14.67	0.44		8.79	11.39	20.18	0.61			
Female	Eligible	21	142.94	0.77	147.34	0.86	4.41	0.93		0.60	0.74	1.34	0.28			
	Not eligible	26	167.01	0.83	176.61	1.22	9.60	2.50		0.69	1.49	2.18	0.57			
	Information not available	3	160.82	2.99	180.25	2.86	19.43	0.58		8.96	8.20	17.16	0.51			

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer for writing for school assignments (collapsed) [W810201], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	131	(1.2)	143	(2.0)
			Suburb	141	(1.2)	153	(1.8)
			Town	138	(2.2)	141	(2.4)
			Rural	139	(1.6)	144	(1.7)
		Female	City	148	(1.3)	160	(1.5)
			Suburb	159	(1.3)	171	(1.7)
			Town	158	(1.5)	162	(1.8)
			Rural	157	(1.5)	165	(1.8)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.86	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.28	**4.29**	**0.000**
Male	City	14	130.68	1.19	142.65	1.98	11.97	1.68		1.42	3.91	5.33	0.75			
	Suburb	19	140.77	1.19	153.24	1.78	12.47	2.37		1.41	3.16	4.56	0.87			
	Town	6	138.00	2.17	140.62	2.40	2.63	0.16		4.71	5.75	10.46	0.63			
	Rural	12	138.50	1.61	143.77	1.68	5.27	0.63		2.58	2.81	5.39	0.65			
Female	City	14	147.96	1.32	159.68	1.49	11.72	1.64		1.75	2.23	3.98	0.56			
	Suburb	19	159.47	1.29	171.36	1.71	11.89	2.26		1.67	2.92	4.58	0.87			
	Town	6	158.27	1.52	161.73	1.80	3.46	0.21		2.30	3.25	5.55	0.33			
	Rural	11	157.00	1.54	165.33	1.84	8.33	0.92		2.36	3.40	5.77	0.63			

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer for writing for school assignments (collapsed) [W810201], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	122	(1.4)	128	(1.9)
			Graduated high school	128	(1.3)	129	(1.7)
			Some education after high school	137	(1.1)	141	(1.5)
			Graduated college	147	(0.9)	157	(1.2)
			Unknown	115	(1.3)	119	(2.3)
		Female	Did not finish high school	139	(1.3)	145	(2.3)
			Graduated high school	147	(1.2)	150	(1.3)
			Some education after high school	159	(1.2)	164	(1.4)
			Graduated college	166	(0.9)	175	(1.1)
			Unknown	134	(1.7)	139	(1.7)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			**Control Group**		**Treatment Group**		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	***test statistic***	***p***
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	5.74	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	2.00	**4.06**	**0.000**
Male	Did no	0	121.75	1.35	128.23	1.87	6.48	0.00		1.83	3.49	5.32	0.00			
	Gradu	8	128.25	1.29	129.35	1.73	1.10	0.09		1.66	2.99	4.65	0.37			
	Some	7	137.50	1.08	141.16	1.50	3.66	0.26		1.17	2.24	3.41	0.24			
	Gradu	27	147.34	0.89	156.69	1.17	9.34	2.52		0.80	1.36	2.16	0.58			
	Unkno	0	114.88	1.34	118.69	2.28	3.81	0.00		1.80	5.21	7.02	0.00			
Female	Did no	0	139.12	1.33	145.16	2.28	6.05	0.00		1.77	5.22	6.99	0.00			
	Gradu	0	147.22	1.15	149.67	1.35	2.46	0.00		1.32	1.81	3.14	0.00			
	Some	8	158.73	1.24	163.89	1.43	5.16	0.41		1.53	2.04	3.57	0.29			
	Gradu	26	165.57	0.90	175.04	1.10	9.47	2.46		0.80	1.22	2.02	0.53			
	Unkno	0	133.70	1.71	138.87	1.73	5.17	0.00		2.92	2.99	5.90	0.00			

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer for writing for school assignments (collapsed) [W810201], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	145	(1.0)	157	(1.4)
			Black	121	(1.2)	127	(1.9)
			Hispanic	127	(0.9)	134	(1.2)
			Asian	153	(2.6)	164	(2.9)
			American Indian/Alaska Native	123	(4.9)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	139	(1.8)	145	(2.1)
		Female	White	164	(0.8)	176	(1.3)
			Black	139	(1.9)	143	(1.4)
			Hispanic	145	(0.7)	153	(1.3)
			Asian	168	(3.1)	180	(2.2)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	160	(1.7)	165	(1.7)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.16	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.54	**4.87**	**0.000**
Male	White	26	145.11	0.97	157.20	1.36	12.09	3.14		0.95	1.86	2.81	0.73			
	Black	6	121.17	1.23	126.58	1.87	5.41	0.32		1.51	3.50	5.00	0.30			
	Hispan	13	126.90	0.93	133.58	1.20	6.69	0.87		0.87	1.43	2.30	0.30			
	Asian	2	152.60	2.58	163.64	2.85	11.04	0.22		6.68	8.14	14.81	0.30			
	Ameri	0	123.26	4.88	‡	†				23.85						
	Native	0	‡	†	‡	†										
	Two o	3	139.48	1.78	144.99	2.09	5.51	0.17		3.17	4.37	7.54	0.23			
Female	White	25	164.31	0.85	175.75	1.33	11.44	2.86		0.72	1.78	2.49	0.62			
	Black	6	138.57	1.89	142.69	1.43	4.12	0.25		3.59	2.04	5.63	0.34			
	Hispan	12	144.78	0.74	152.77	1.28	8.00	0.96		0.55	1.63	2.18	0.26			
	Asian	2	168.24	3.08	179.65	2.23	11.41	0.23		9.49	4.98	14.48	0.29			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	159.95	1.70	164.71	1.75	4.75	0.14		2.90	3.05	5.94	0.18			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer for writing for school assignments (collapsed) [W810201], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	128	(1.0)	134	(1.2)
			Suburb	135	(1.0)	141	(1.6)
			Town	137	(1.5)	140	(2.3)
			Rural	135	(1.5)	141	(1.8)
		Not eligible	City	154	(1.3)	166	(1.6)
			Suburb	159	(1.2)	173	(1.8)
			Town	156	(1.8)	159	(1.8)
			Rural	155	(1.3)	164	(1.8)
		Information not available	City	150	(3.7)	174	(4.3)
			Suburb	158	(5.2)	170	(4.8)
			Town	151	(5.2)	‡	†
			Rural	156	(4.8)	161	(6.7)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.88	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.51	**3.48**	**0.001**
Eligible	City	15	128.17	0.98	134.14	1.23	5.97	0.90		0.95	1.51	2.46	0.37			
	Suburb	13	134.86	1.04	140.78	1.56	5.91	0.77		1.08	2.42	3.50	0.46			
	Town	5	136.71	1.53	140.48	2.28	3.76	0.19		2.36	5.18	7.53	0.38			
	Rural	9	135.44	1.51	141.39	1.81	5.95	0.54		2.29	3.29	5.58	0.50			
Not eligible	City	10	154.35	1.32	166.16	1.63	11.81	1.18		1.74	2.66	4.41	0.44			
	Suburb	23	158.72	1.16	172.64	1.79	13.92	3.20		1.36	3.21	4.56	1.05			
	Town	6	155.95	1.78	158.60	1.77	2.65	0.16		3.18	3.13	6.30	0.38			
	Rural	13	154.87	1.26	163.70	1.75	8.84	1.15		1.58	3.08	4.66	0.61			
Information not av	City	2	149.64	3.74	174.25	4.30	24.61	0.49		14.02	18.49	32.51	0.65			
	Suburb	2	157.57	5.18	170.10	4.81	12.53	0.25		26.81	23.18	49.99	1.00			
	Town	1	150.59	5.21	‡	†				27.12						
	Rural	1	155.60	4.83	161.38	6.69	5.78	0.06		23.30	44.76	68.06	0.68			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer for writing for school assignments (collapsed) [W810201], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	130	(1.2)	135	(1.7)
			Graduated high school	131	(1.0)	134	(1.1)
			Some education after high school	142	(1.1)	145	(1.3)
			Graduated college	139	(0.9)	145	(1.2)
			Unknown	119	(1.3)	124	(1.6)
		Not eligible	Did not finish high school	138	(2.5)	153	(3.4)
			Graduated high school	147	(1.5)	151	(2.0)
			Some education after high school	155	(1.5)	163	(1.8)
			Graduated college	161	(0.8)	172	(1.2)
			Unknown	134	(2.2)	141	(3.4)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	‡	†	‡	†
			Some education after high school	149	(4.1)	‡	†
			Graduated college	158	(2.8)	175	(2.5)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.55	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.88	**3.83**	**0.000**
Eligible	Did no	6	129.64	1.21	135.24	1.65	5.60	0.34		1.46	2.73	4.19	0.25			
	Gradu	10	130.51	1.00	133.71	1.10	3.20	0.32		0.99	1.21	2.20	0.22			
	Some	8	141.87	1.06	144.90	1.29	3.02	0.24		1.12	1.67	2.79	0.22			
	Gradu	13	139.02	0.93	144.53	1.24	5.50	0.72		0.87	1.55	2.42	0.31			
	Unkno	6	118.53	1.25	123.58	1.58	5.05	0.30		1.57	2.49	4.06	0.24			
Not eligible	Did no	1	137.90	2.46	152.57	3.36	14.67	0.15		6.05	11.29	17.34	0.17			
	Gradu	6	147.47	1.54	151.01	2.00	3.54	0.21		2.36	4.00	6.36	0.38			
	Some	7	154.99	1.50	162.62	1.83	7.63	0.53		2.25	3.35	5.59	0.39			
	Gradu	36	161.31	0.81	172.17	1.24	10.85	3.91		0.65	1.55	2.20	0.79			
	Unkno	2	133.95	2.18	141.01	3.36	7.06	0.14		4.77	11.32	16.09	0.32			
Information not a	Did no	0	‡	†	‡	†										
	Gradu	0	‡	†	‡	†										
	Some	1	148.54	4.12	‡	†				16.96						
	Gradu	4	157.71	2.83	174.95	2.47	17.23	0.69		7.99	6.11	14.10	0.56			
	Unkno	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer for writing for school assignments (collapsed) [W810201], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	140	(1.1)	149	(1.4)
			Black	125	(1.4)	128	(1.4)
			Hispanic	130	(0.8)	135	(1.1)
			Asian	146	(3.2)	155	(3.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	140	(2.1)	144	(1.9)
		Not eligible	White	159	(0.8)	171	(1.4)
			Black	141	(1.7)	148	(2.1)
			Hispanic	147	(1.2)	157	(1.4)
			Asian	167	(2.6)	180	(2.3)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	158	(1.8)	166	(2.2)
		Information not available	White	156	(3.2)	176	(2.4)
			Black	‡	†	‡	†
			Hispanic	146	(3.1)	163	(4.9)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.86	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.17	**4.34**	**0.000**
Eligible	White	13	140.00	1.13	148.67	1.38	8.67	1.13		1.27	1.91	3.18	0.41			
	Black	8	124.66	1.39	127.76	1.41	3.10	0.25		1.92	1.99	3.92	0.31			
	Hispan	16	129.67	0.81	134.75	1.10	5.08	0.81		0.66	1.20	1.86	0.30			
	Asian	1	146.17	3.18	154.54	3.07	8.37	0.08		10.13	9.44	19.57	0.20			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	140.33	2.09	143.88	1.93	3.54	0.11		4.36	3.72	8.08	0.24			
Not eligible	White	35	159.40	0.77	171.35	1.43	11.95	4.18		0.59	2.04	2.63	0.92			
	Black	3	141.24	1.66	148.27	2.05	7.03	0.21		2.75	4.22	6.97	0.21			
	Hispan	8	147.31	1.24	157.45	1.42	10.15	0.81		1.55	2.01	3.55	0.28			
	Asian	2	166.66	2.59	179.80	2.31	13.14	0.26		6.71	5.35	12.06	0.24			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	157.56	1.79	165.80	2.17	8.24	0.25		3.22	4.69	7.91	0.24			
Information not a	White	3	156.26	3.23	176.17	2.36	19.91	0.60		10.42	5.55	15.98	0.48			
	Black	0	‡	†	‡	†										
	Hispan	1	146.04	3.12	162.85	4.93	16.81	0.17		9.73	24.30	34.03	0.34			
	Asian	0	‡	†	‡	†										
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer for writing for school assignments (collapsed) [W810201], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	127	(1.9)	135	(2.2)
			Graduated high school	131	(1.4)	135	(2.1)
			Some education after high school	143	(1.4)	149	(2.1)
			Graduated college	150	(1.4)	163	(1.5)
			Unknown	119	(2.0)	124	(2.2)
		Suburb	Did not finish high school	132	(1.8)	142	(3.2)
			Graduated high school	140	(1.5)	144	(1.8)
			Some education after high school	147	(1.7)	156	(1.9)
			Graduated college	160	(1.2)	171	(1.6)
			Unknown	125	(2.2)	136	(2.8)
		Town	Did not finish high school	134	(4.0)	‡	†
			Graduated high school	138	(2.4)	142	(3.0)
			Some education after high school	155	(2.3)	157	(2.9)
			Graduated college	154	(1.8)	160	(1.7)
			Unknown	123	(3.5)	‡	†
		Rural	Did not finish high school	135	(3.2)	140	(3.9)
			Graduated high school	139	(1.9)	141	(2.9)
			Some education after high school	150	(1.9)	153	(2.5)
			Graduated college	154	(1.6)	163	(1.8)
			Unknown	127	(2.2)	128	(3.7)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.11	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.90	**3.09**	**0.002**
City	Did no	3	126.53	1.88	135.11	2.20	8.57	0.26		3.54	4.85	8.39	0.25			
	Gradua	4	131.33	1.36	134.69	2.06	3.36	0.13		1.86	4.24	6.10	0.24			
	Some e	4	143.02	1.43	148.80	2.06	5.78	0.23		2.05	4.26	6.31	0.25			
	Gradua	13	150.00	1.39	162.74	1.54	12.74	1.66		1.93	2.38	4.31	0.56			
	Unkno	3	119.09	2.02	124.29	2.20	5.20	0.16		4.07	4.86	8.93	0.27			
Suburb	Did no	2	132.39	1.77	141.93	3.19	9.54	0.19		3.15	10.19	13.34	0.27			
	Gradua	5	139.61	1.54	144.03	1.83	4.42	0.22		2.37	3.37	5.73	0.29			
	Some e	6	147.43	1.65	156.10	1.91	8.67	0.52		2.73	3.64	6.37	0.38			
	Gradua	22	159.74	1.16	171.48	1.60	11.74	2.58		1.34	2.57	3.91	0.86			
	Unkno	3	125.07	2.22	136.48	2.77	11.41	0.34		4.92	7.70	12.61	0.38			
Town	Did no	1	134.10	4.00	‡	†				16.02						
	Gradua	2	137.59	2.43	141.74	3.01	4.14	0.08		5.89	9.08	14.97	0.30			
	Some e	2	154.83	2.33	157.46	2.88	2.63	0.05		5.43	8.30	13.73	0.27			
	Gradua	6	154.38	1.80	159.56	1.73	5.18	0.31		3.25	3.00	6.26	0.38			
	Unkno	1	122.97	3.53	‡	†				12.49						
Rural	Did no	1	134.69	3.18	140.20	3.92	5.51	0.06		10.10	15.39	25.49	0.25			
	Gradua	4	138.94	1.86	141.38	2.93	2.44	0.10		3.46	8.57	12.02	0.48			
	Some e	4	150.21	1.86	152.75	2.46	2.55	0.10		3.47	6.07	9.54	0.38			
	Gradua	12	154.20	1.60	163.21	1.84	9.01	1.08		2.55	3.39	5.94	0.71			
	Unkno	2	126.54	2.21	128.29	3.71	1.75	0.04		4.87	13.73	18.60	0.37			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer for writing for school assignments (collapsed) [W810201], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	153	(1.5)	169	(1.7)
			Black	127	(2.0)	128	(2.0)
			Hispanic	131	(1.3)	143	(1.7)
			Asian	154	(3.5)	167	(2.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	145	(2.2)	153	(2.6)
		Suburb	White	159	(1.3)	173	(1.9)
			Black	130	(2.0)	142	(2.2)
			Hispanic	137	(1.2)	146	(1.8)
			Asian	166	(2.7)	181	(3.0)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	153	(2.4)	160	(3.1)
		Town	White	151	(1.7)	160	(2.0)
			Black	131	(3.6)	130	(5.4)
			Hispanic	138	(1.8)	139	(3.9)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	†	†	‡	†
			Two or more races	151	(4.2)	‡	†
		Rural	White	150	(1.4)	161	(1.7)
			Black	132	(3.9)	136	(3.5)
			Hispanic	140	(1.8)	143	(2.6)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	148	(2.4)	153	(4.1)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.52	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	8.08	**2.65**	**0.008**
City	Did no	3	153.35	1.47	169.12	1.72	15.77	0.47		2.15	2.96	5.12	0.15			
	Gradu	4	127.21	1.96	128.42	2.03	1.21	0.05		3.83	4.13	7.96	0.32			
	Some	4	130.90	1.25	142.76	1.70	11.86	0.47		1.57	2.88	4.46	0.18			
	Gradu	13	154.19	3.55	166.69	2.07	12.50	1.62		12.58	4.29	16.87	2.19			
	Unkno	3	‡	†	‡	†										
Suburb	Did no	2	‡	†	‡	†										
	Gradu	5	144.53	2.18	153.25	2.61	8.73	0.44		4.77	6.81	11.58	0.58			
	Some	6	158.69	1.31	172.58	1.92	13.90	0.83		1.72	3.70	5.41	0.32			
	Gradu	22	130.07	1.96	142.18	2.19	12.11	2.66		3.86	4.78	8.64	1.90			
	Unkno	3	137.24	1.17	146.26	1.84	9.02	0.27		1.38	3.40	4.78	0.14			
Town	Did no	1	166.13	2.69	180.73	2.95	14.60	0.15		7.25	8.73	15.98	0.16			
	Gradu	2	‡	†	‡	†										
	Some	2	‡	†	‡	†										
	Gradu	6	153.02	2.37	160.44	3.05	7.42	0.45		5.61	9.32	14.92	0.90			
	Unkno	1	151.07	1.70	159.80	2.05	8.73	0.09		2.88	4.20	7.08	0.07			
Rural	Did no	1	130.71	3.61	129.71	5.42	-1.00	-0.01		13.06	29.40	42.46	0.42			
	Gradu	4	138.40	1.84	139.08	3.87	0.67	0.03		3.39	14.97	18.36	0.73			
	Some	4	‡	†	‡	†										
	Gradu	12	‡	†	‡	†										
	Unkno	2	‡	†	‡	†										

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer for writing for school assignments (collapsed) [W810201], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	134	(2.2)	151	(3.9)
			Black	116	(4.0)	117	(3.8)
			Hispanic	131	(1.4)	136	(1.6)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	143	(1.5)	151	(1.8)
			Black	124	(2.2)	123	(2.4)
			Hispanic	132	(1.4)	136	(1.9)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	140	(3.5)	141	(3.5)
		Some education after high school	White	154	(1.2)	162	(2.0)
			Black	134	(1.9)	142	(2.7)
			Hispanic	144	(1.6)	146	(1.8)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(3.2)	152	(3.2)
		Graduated college	White	161	(0.8)	173	(1.3)
			Black	136	(1.6)	140	(1.7)
			Hispanic	146	(1.3)	157	(1.5)
			Asian	164	(2.5)	179	(2.0)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	†	†	‡	†
			Two or more races	156	(1.8)	162	(2.2)
		Unknown	White	131	(2.1)	134	(3.6)
			Black	112	(3.3)	121	(3.5)
			Hispanic	118	(1.4)	124	(1.8)
			Asian	144	(5.0)	†	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	130	(4.3)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.31	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.99	3.40	0.001
Did not finish high	White	2	134.47	2.25	150.94	3.90	16.47	0.33		5.06	15.19	20.24	0.40			
	Black	1	115.67	3.98	117.40	3.84	1.73	0.02		15.83	14.76	30.59	0.31			
	Hispan	4	130.62	1.45	135.78	1.59	5.16	0.21		2.09	2.53	4.62	0.18			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										
Graduated high sc	White	7	143.42	1.46	150.81	1.85	7.39	0.52		2.14	3.41	5.55	0.39			
	Black	2	123.58	2.19	123.31	2.42	-0.26	-0.01		4.81	5.88	10.69	0.21			
	Hispan	5	132.28	1.36	135.99	1.93	3.71	0.19		1.85	3.72	5.57	0.28			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	140.42	3.46	141.39	3.51	0.97	0.01		11.95	12.35	24.30	0.24			
Some education a	White	7	153.73	1.22	161.93	1.95	8.20	0.57		1.49	3.82	5.31	0.37			
	Black	2	133.99	1.86	141.64	2.73	7.65	0.15		3.45	7.46	10.91	0.22			
	Hispan	4	143.88	1.62	146.39	1.82	2.51	0.10		2.61	3.30	5.92	0.24			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	149.19	3.18	151.90	3.17	2.71	0.03		10.08	10.08	20.16	0.20			
Graduated college	White	33	160.59	0.81	172.71	1.31	12.12	4.00		0.66	1.73	2.39	0.79			
	Black	5	136.13	1.60	140.10	1.65	3.97	0.20		2.55	2.73	5.28	0.26			
	Hispan	8	145.80	1.32	156.70	1.46	10.90	0.87		1.73	2.12	3.85	0.31			
	Asian	3	164.30	2.45	179.04	2.03	14.73	0.44		6.03	4.12	10.15	0.30			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	4	155.62	1.85	162.13	2.17	6.51	0.26		3.41	4.69	8.10	0.32			
Unknown	White	3	130.60	2.13	134.48	3.57	3.88	0.12		4.54	12.77	17.32	0.52			
	Black	1	112.00	3.25	120.65	3.47	8.65	0.09		10.58	12.04	22.62	0.23			
	Hispan	4	117.98	1.36	123.52	1.83	5.55	0.22		1.85	3.36	5.20	0.21			
	Asian	0	143.71	4.97	‡	†				24.68						
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	130.40	4.26	‡	†				18.16						

Appendix C.11

Writing for School Assignments Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer: http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer from the beginning to write paper (collapsed) [W810102], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	low use (collapsed) Average scale score	low use (collapsed) Standard error	high use (collapsed) Average scale score	high use (collapsed) Standard error
National	2011	Male	Eligible	123	(0.7)	130	(1.2)
			Not eligible	147	(1.0)	157	(1.0)
			Information not available	146	(3.1)	161	(3.0)
		Female	Eligible	143	(0.7)	147	(1.0)
			Not eligible	168	(0.8)	176	(1.1)
			Information not available	162	(2.9)	178	(2.6)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANC	*test*	*p*
Gender	Natio	Percent	Average scale score	Standard error	Average scale score	Standard error	Difference of Means	Weighted	7.84	Variance	Variance	Variance	Weighted	2.73	4.74	0.000
Male	Eligibl	21	123.18	0.66	129.92	1.23	6.74	1.42		0.44	1.51	1.94	0.41			
	Not el	27	147.42	0.96	156.94	1.02	9.53	2.57		0.92	1.05	1.97	0.53			
	Inform	3	145.90	3.10	160.96	3.01	15.06	0.45		9.59	9.03	18.62	0.56			
Female	Eligibl	21	143.29	0.67	146.93	0.96	3.63	0.76		0.45	0.92	1.37	0.29			
	Not el	26	167.76	0.84	175.97	1.11	8.21	2.14		0.71	1.23	1.94	0.50			
	Inform	3	161.66	2.86	178.23	2.56	16.58	0.50		8.19	6.54	14.73	0.44			

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Average scale scores for writing, grade 8 by use computer from the beginning to write paper (collapsed) [W810102], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	130	(1.2)	143	(1.7)
			Suburb	140	(1.3)	153	(1.5)
			Town	135	(1.5)	145	(2.8)
			Rural	137	(1.5)	147	(1.8)
		Female	City	148	(1.3)	161	(1.4)
			Suburb	160	(1.3)	171	(1.5)
			Town	158	(1.8)	162	(1.7)
			Rural	157	(1.5)	165	(1.7)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	10.90	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.85	**4.95**	**0.000**
Male	City	14	129.91	1.18	143.36	1.71	13.45	1.88		1.38	2.92	4.30	0.60			
	Suburb	19	140.37	1.33	153.01	1.54	12.64	2.40		1.77	2.38	4.15	0.79			
	Town	6	135.20	1.50	144.83	2.77	9.63	0.58		2.24	7.68	9.92	0.60			
	Rural	12	136.81	1.48	146.65	1.82	9.84	1.18		2.18	3.32	5.50	0.66			
Female	City	14	148.30	1.30	160.61	1.38	12.32	1.72		1.70	1.90	3.60	0.50			
	Suburb	19	160.41	1.30	170.70	1.51	10.28	1.95		1.70	2.29	3.99	0.76			
	Town	6	157.59	1.77	162.02	1.74	4.43	0.27		3.12	3.04	6.15	0.37			
	Rural	11	156.98	1.51	165.31	1.71	8.33	0.92		2.27	2.94	5.20	0.57			

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Average scale scores for writing, grade 8 by use computer from the beginning to write paper (collapsed) [W810102], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	123	(1.3)	125	(2.3)
			Graduated high school	127	(1.3)	131	(1.7)
			Some education after high school	136	(1.1)	145	(1.4)
			Graduated college	147	(0.9)	157	(1.1)
			Unknown	114	(1.4)	122	(2.3)
		Female	Did not finish high school	141	(1.1)	143	(2.2)
			Graduated high school	147	(1.0)	151	(1.6)
			Some education after high school	159	(1.2)	163	(1.2)
			Graduated college	167	(0.8)	174	(1.0)
			Unknown	133	(1.5)	140	(1.9)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.06	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	1.80	**4.51**	**0.000**
Male	Did no	0	123.10	1.33	124.55	2.33	1.45	0.00		1.78	5.42	7.20	0.00			
	Gradu	8	127.22	1.26	131.17	1.70	3.96	0.32		1.59	2.90	4.49	0.36			
	Some	7	135.57	1.06	144.56	1.43	8.99	0.63		1.13	2.05	3.18	0.22			
	Gradu	27	146.57	0.91	156.75	1.10	10.19	2.75		0.83	1.22	2.05	0.55			
	Unkno	0	114.16	1.36	121.80	2.29	7.64	0.00		1.85	5.22	7.07	0.00			
Female	Did no	0	140.71	1.14	143.06	2.17	2.35	0.00		1.29	4.69	5.99	0.00			
	Gradu	0	146.60	1.02	150.84	1.56	4.25	0.00		1.04	2.44	3.48	0.00			
	Some	8	158.98	1.21	163.28	1.22	4.30	0.34		1.48	1.48	2.96	0.24			
	Gradu	26	166.60	0.82	174.37	0.99	7.77	2.02		0.67	0.99	1.66	0.43			
	Unkno	0	133.05	1.52	140.48	1.91	7.44	0.00		2.32	3.66	5.97	0.00			

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Average scale scores for writing, grade 8 by use computer from the beginning to write paper (collapsed) [W810102], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	145	(0.9)	156	(1.2)
			Black	122	(1.4)	127	(1.5)
			Hispanic	126	(0.8)	135	(1.2)
			Asian	151	(3.4)	165	(2.6)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	137	(1.8)	148	(2.0)
		Female	White	166	(0.9)	174	(1.2)
			Black	139	(1.8)	142	(1.7)
			Hispanic	144	(0.8)	154	(1.2)
			Asian	168	(2.5)	181	(2.3)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	158	(1.6)	166	(2.1)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.09	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.28	**5.02**	**0.000**
Male	White	26	144.59	0.90	156.45	1.20	11.87	3.09		0.81	1.44	2.26	0.59			
	Black	6	121.63	1.37	126.63	1.51	5.00	0.30		1.87	2.27	4.14	0.25			
	Hispan	13	125.84	0.78	135.25	1.19	9.40	1.22		0.60	1.42	2.02	0.26			
	Asian	2	150.98	3.35	165.33	2.58	14.35	0.29		11.24	6.64	17.88	0.36			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	137.34	1.85	147.59	1.98	10.25	0.31		3.41	3.92	7.34	0.22			
Female	White	25	165.71	0.88	174.11	1.18	8.40	2.10		0.77	1.40	2.17	0.54			
	Black	6	139.30	1.78	142.35	1.70	3.05	0.18		3.17	2.89	6.07	0.36			
	Hispan	12	144.41	0.76	153.50	1.20	9.09	1.09		0.58	1.45	2.03	0.24			
	Asian	2	167.80	2.53	181.39	2.30	13.58	0.27		6.41	5.28	11.69	0.23			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	158.35	1.61	166.45	2.14	8.10	0.24		2.60	4.59	7.19	0.22			

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Average scale scores for writing, grade 8 by use computer from the beginning to write paper (collapsed) [W810102], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	128	(1.0)	134	(1.2)
			Suburb	135	(1.1)	141	(1.6)
			Town	136	(1.5)	142	(2.3)
			Rural	136	(1.4)	142	(2.2)
		Not eligible	City	155	(1.7)	165	(1.3)
			Suburb	161	(1.3)	170	(1.6)
			Town	155	(1.7)	158	(2.0)
			Rural	154	(1.3)	165	(1.6)
		Information not available	City	154	(4.5)	173	(3.9)
			Suburb	155	(5.7)	169	(4.1)
			Town	‡	†	‡	†
			Rural	156	(3.5)	160	(9.1)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.92	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.84	**3.03**	**0.002**
Eligible	City	15	128.37	0.98	134.38	1.19	6.00	0.90		0.96	1.43	2.38	0.36			
	Suburb	13	135.12	1.06	140.65	1.56	5.53	0.72		1.12	2.44	3.56	0.46			
	Town	5	135.90	1.45	141.99	2.29	6.09	0.30		2.11	5.25	7.37	0.37			
	Rural	9	135.53	1.36	141.72	2.19	6.19	0.56		1.84	4.80	6.63	0.60			
Not eligible	City	10	155.21	1.70	164.98	1.32	9.76	0.98		2.90	1.75	4.65	0.46			
	Suburb	23	160.77	1.33	170.26	1.59	9.49	2.18		1.78	2.53	4.32	0.99			
	Town	6	155.31	1.65	158.47	1.98	3.16	0.19		2.73	3.93	6.66	0.40			
	Rural	13	153.85	1.31	164.56	1.62	10.71	1.39		1.71	2.61	4.32	0.56			
Information not av	City	2	153.85	4.46	173.04	3.88	19.19	0.38		19.90	15.09	34.99	0.70			
	Suburb	2	154.85	5.70	168.73	4.11	13.88	0.28		32.49	16.87	49.36	0.99			
	Town	1	‡	†	‡	†										
	Rural	1	156.30	3.46	160.21	9.08	3.91	0.04		12.00	82.50	94.51	0.95			

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Average scale scores for writing, grade 8 by use computer from the beginning to write paper (collapsed) [W810102], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	131	(1.0)	132	(2.0)
			Graduated high school	131	(0.9)	133	(1.6)
			Some education after high school	141	(1.1)	147	(1.4)
			Graduated college	139	(0.8)	145	(1.5)
			Unknown	118	(1.3)	126	(2.0)
		Not eligible	Did not finish high school	141	(2.5)	149	(3.8)
			Graduated high school	146	(1.5)	152	(2.0)
			Some education after high school	155	(1.6)	162	(1.7)
			Graduated college	163	(0.9)	170	(1.1)
			Unknown	134	(2.1)	141	(3.1)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	‡	†	‡	†
			Some education after high school	‡	†	161	(5.0)
			Graduated college	159	(2.5)	172	(2.4)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.33	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.99	**3.17**	**0.002**
Eligible	Did no	6	131.12	1.00	132.33	2.05	1.21	0.07		0.99	4.19	5.18	0.31			
	Gradu	10	131.00	0.93	132.74	1.56	1.74	0.17		0.87	2.44	3.31	0.33			
	Some	8	141.21	1.10	146.53	1.35	5.32	0.43		1.21	1.82	3.03	0.24			
	Gradu	13	139.05	0.80	144.90	1.45	5.85	0.76		0.64	2.11	2.74	0.36			
	Unkno	6	118.09	1.32	125.87	2.01	7.78	0.47		1.75	4.06	5.81	0.35			
Not eligible	Did no	1	141.08	2.53	148.59	3.75	7.52	0.08		6.42	14.07	20.49	0.20			
	Gradu	6	146.47	1.51	152.24	1.97	5.78	0.35		2.28	3.89	6.17	0.37			
	Some	7	154.90	1.61	161.63	1.66	6.73	0.47		2.58	2.75	5.33	0.37			
	Gradu	36	162.55	0.88	170.47	1.07	7.92	2.85		0.77	1.15	1.93	0.69			
	Unkno	2	134.05	2.15	141.29	3.13	7.23	0.14		4.62	9.79	14.40	0.29			
Information not av	Did no	0	‡	†	‡	†										
	Gradu	0	‡	†	‡	†										
	Some	1	‡	†	160.83	4.98					24.81					
	Gradu	4	158.77	2.51	172.45	2.36	13.68	0.55		6.28	5.55	11.83	0.47			
	Unkno	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by use computer from the beginning to write paper (collapsed) [W810102], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	141	(1.0)	147	(1.4)
			Black	125	(1.3)	128	(1.6)
			Hispanic	129	(0.8)	136	(1.2)
			Asian	146	(3.3)	155	(3.2)
			American Indian/Alaska Native	122	(5.3)	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	139	(2.0)	145	(2.4)
		Not eligible	White	160	(0.9)	169	(1.3)
			Black	144	(2.0)	146	(1.7)
			Hispanic	148	(1.1)	157	(1.5)
			Asian	168	(3.1)	180	(2.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	157	(2.0)	166	(1.9)
		Information not available	White	158	(3.1)	173	(2.2)
			Black	‡	†	‡	†
			Hispanic	147	(3.9)	162	(4.4)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.35	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.22	**3.58**	**0.000**
Eligible	White	13	140.99	1.03	146.70	1.44	5.71	0.74		1.06	2.08	3.15	0.41			
	Black	8	124.90	1.28	128.08	1.59	3.18	0.25		1.63	2.53	4.16	0.33			
	Hispan	16	129.23	0.78	135.62	1.20	6.40	1.02		0.61	1.45	2.06	0.33			
	Asian	1	146.27	3.30	155.44	3.18	9.17	0.09		10.91	10.09	21.01	0.21			
	Americ	0	121.69	5.29	‡	†				28.03						
	Native	0	‡	†	‡	†										
	Two o	3	139.49	2.02	145.32	2.43	5.83	0.17		4.07	5.92	9.99	0.30			
Not eligible	White	35	160.42	0.88	169.40	1.28	8.98	3.14		0.77	1.64	2.41	0.84			
	Black	3	143.76	2.01	145.56	1.67	1.80	0.05		4.06	2.78	6.83	0.20			
	Hispan	8	147.53	1.12	156.79	1.51	9.25	0.74		1.25	2.28	3.52	0.28			
	Asian	2	167.60	3.15	180.09	2.09	12.49	0.25		9.90	4.36	14.25	0.29			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	156.80	2.04	165.93	1.88	9.13	0.27		4.17	3.52	7.69	0.23			
Information not av	White	3	157.69	3.11	172.81	2.24	15.12	0.45		9.64	5.01	14.66	0.44			
	Black	0	‡	†	‡	†										
	Hispan	1	146.69	3.94	161.83	4.41	15.13	0.15		15.50	19.43	34.94	0.35			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by use computer from the beginning to write paper (collapsed) [W810102], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	129	(1.5)	131	(2.3)
			Graduated high school	131	(1.4)	136	(2.0)
			Some education after high school	142	(1.4)	150	(1.9)
			Graduated college	151	(1.4)	162	(1.5)
			Unknown	119	(1.9)	127	(2.8)
		Suburb	Did not finish high school	135	(2.0)	137	(3.1)
			Graduated high school	140	(1.3)	142	(2.2)
			Some education after high school	148	(1.8)	155	(1.9)
			Graduated college	161	(1.2)	170	(1.5)
			Unknown	125	(2.0)	139	(3.2)
		Town	Did not finish high school	135	(3.5)	‡	†
			Graduated high school	137	(2.5)	143	(2.8)
			Some education after high school	154	(2.5)	159	(2.4)
			Graduated college	153	(1.5)	160	(1.9)
			Unknown	123	(4.1)	‡	†
		Rural	Did not finish high school	136	(2.2)	138	(6.6)
			Graduated high school	138	(2.0)	143	(3.2)
			Some education after high school	149	(1.7)	156	(2.2)
			Graduated college	154	(1.6)	163	(1.7)
			Unknown	125	(2.6)	132	(4.0)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.66	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.19	**2.86**	**0.004**
City	Did no	3	128.61	1.53	130.92	2.26	2.31	0.07		2.36	5.09	7.45	0.22			
	Gradu	4	130.78	1.36	136.30	2.00	5.52	0.22		1.85	3.98	5.84	0.23			
	Some	4	142.02	1.42	150.11	1.89	8.09	0.32		2.02	3.57	5.59	0.22			
	Gradu	13	151.20	1.45	161.89	1.51	10.69	1.39		2.09	2.28	4.37	0.57			
	Unkno	3	118.62	1.90	126.57	2.75	7.94	0.24		3.60	7.57	11.17	0.34			
Suburb	Did no	2	135.19	2.00	137.50	3.11	2.31	0.05		4.00	9.69	13.70	0.27			
	Gradu	5	140.32	1.31	142.46	2.18	2.14	0.11		1.71	4.77	6.48	0.32			
	Some	6	147.74	1.80	155.16	1.88	7.42	0.45		3.25	3.55	6.80	0.41			
	Gradu	22	161.18	1.20	169.92	1.47	8.74	1.92		1.44	2.15	3.59	0.79			
	Unkno	3	124.64	1.97	139.45	3.21	14.82	0.44		3.88	10.33	14.21	0.43			
Town	Did no	1	135.26	3.49	‡	†				12.19						
	Gradu	2	136.97	2.46	142.68	2.80	5.71	0.11		6.07	7.87	13.94	0.28			
	Some	2	153.60	2.51	159.36	2.40	5.76	0.12		6.31	5.74	12.05	0.24			
	Gradu	6	153.21	1.45	159.98	1.94	6.78	0.41		2.11	3.77	5.88	0.35			
	Unkno	1	123.14	4.11	‡	†				16.86						
Rural	Did no	1	136.06	2.15	137.99	6.59	1.92	0.02		4.64	43.37	48.02	0.48			
	Gradu	4	137.97	2.00	142.85	3.25	4.88	0.20		4.01	10.56	14.57	0.58			
	Some	4	148.62	1.75	156.03	2.23	7.41	0.30		3.06	4.99	8.04	0.32			
	Gradu	12	153.80	1.61	163.48	1.73	9.68	1.16		2.61	2.99	5.60	0.67			
	Unkno	2	125.21	2.60	132.37	4.02	7.16	0.14		6.77	16.13	22.90	0.46			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer from the beginning to write paper (collapsed) [W810102], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	155	(1.6)	167	(1.5)
			Black	126	(1.9)	131	(2.3)
			Hispanic	132	(1.2)	142	(1.4)
			Asian	154	(3.1)	168	(2.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	145	(2.5)	154	(2.4)
		Suburb	White	160	(1.3)	170	(1.8)
			Black	134	(1.9)	139	(2.3)
			Hispanic	137	(1.2)	146	(1.8)
			Asian	169	(3.2)	179	(3.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	151	(2.3)	162	(3.0)
		Town	White	151	(2.1)	158	(1.8)
			Black	130	(3.7)	‡	†
			Hispanic	136	(1.8)	142	(3.9)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	150	(3.7)	‡	†
		Rural	White	150	(1.3)	161	(1.7)
			Black	133	(3.7)	135	(3.7)
			Hispanic	137	(1.8)	149	(2.4)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	146	(3.0)	156	(3.3)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.07	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.12	3.02	0.002
City	White	9	z	1.64	166.90	1.54				2.69	2.38	5.07	0.46			
	Black	5	125.91	1.95	130.92	2.35	5.01	0.25		3.79	5.52	9.32	0.47			
	Hispan	10	131.52	1.16	141.98	1.37	10.46	1.05		1.34	1.89	3.23	0.32			
	Asian	2	153.79	3.12	167.58	2.47	13.79	0.28		9.73	6.11	15.84	0.32			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	2	145.11	2.49	153.95	2.41	8.84	0.18		6.22	5.80	12.02	0.24			
Suburb	White	20	160.22	1.32	170.37	1.81	10.15	2.03		1.74	3.27	5.01	1.00			
	Black	4	133.89	1.92	138.57	2.35	4.68	0.19		3.69	5.52	9.20	0.37			
	Hispan	10	137.31	1.19	146.04	1.80	8.73	0.87		1.42	3.23	4.65	0.47			
	Asian	2	168.67	3.20	178.97	3.14	10.29	0.21		10.25	9.88	20.13	0.40			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	151.14	2.29	161.61	2.96	10.46	0.31		5.24	8.73	13.98	0.42			
Town	White	8	151.46	2.06	157.61	1.85	6.15	0.49		4.25	3.42	7.67	0.61			
	Black	1	130.20	3.74	‡	†				13.97						
	Hispan	2	136.18	1.80	142.23	3.89	6.05	0.12		3.23	15.12	18.35	0.37			
	Asian	0	‡	†	‡	†										
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	1	149.61	3.73	‡	†				13.88						
Rural	White	15	150.28	1.28	160.73	1.67	10.45	1.57		1.64	2.80	4.45	0.67			
	Black	2	132.53	3.68	135.42	3.72	2.89	0.06		13.55	13.87	27.42	0.55			
	Hispan	3	136.70	1.78	149.09	2.39	12.39	0.37		3.16	5.70	8.86	0.27			
	Asian	0	‡	†	‡	†										
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	1	145.64	2.99	155.60	3.27	9.96	0.10		8.97	10.70	19.67	0.20			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer from the beginning to write paper (collapsed) [W810102], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	138	(2.2)	143	(3.9)
			Black	120	(3.8)	‡	†
			Hispanic	131	(1.3)	134	(1.9)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	144	(1.4)	148	(2.3)
			Black	124	(2.1)	122	(2.4)
			Hispanic	132	(1.3)	136	(2.0)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	138	(3.6)	146	(3.4)
		Some education after high school	White	154	(1.4)	161	(1.6)
			Black	135	(2.1)	140	(2.4)
			Hispanic	142	(1.4)	149	(1.9)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	147	(2.9)	155	(2.6)
		Graduated college	White	162	(0.9)	171	(1.1)
			Black	137	(1.6)	140	(1.6)
			Hispanic	146	(1.1)	156	(1.5)
			Asian	166	(2.4)	179	(2.2)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	155	(1.8)	163	(2.2)
		Unknown	White	130	(2.3)	136	(3.2)
			Black	112	(2.8)	121	(4.1)
			Hispanic	118	(1.3)	126	(2.1)
			Asian	144	(4.6)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	127	(4.9)	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-1.11	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of	4.60	-0.52	0.605
Did not finish high	White	2	137.93	2.17	143.33	3.87				3.70						
	Black	1	119.82	3.76	‡	†				8.18						
	Hispan	4	131.33	1.26	134.05	1.93				1.14						
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†				25.56						
Graduated high sc	White	7	144.45	1.38	148.22	2.31				1.68						
	Black	2	124.09	2.07	121.79	2.42				3.21						
	Hispan	5	132.26	1.25	135.68	2.04				1.41						
	Asian	0	‡	†	‡	†				47.37						
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	137.64	3.61	146.09	3.41				7.54						
Some education a	White	7	153.67	1.37	161.00	1.63				1.18						
	Black	2	135.43	2.06	140.29	2.39				3.19						
	Hispan	4	142.35	1.39	149.14	1.88				1.93						
	Asian	0	‡	†	‡	†				14.08						
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	147.23	2.89	154.83	2.64				5.62						
Graduated college	White	33	161.77	0.93	170.86	1.11	-2.07	-0.68		0.81	7.54	8.35	2.76			
	Black	5	136.58	1.63	140.43	1.61				1.75						
	Hispan	8	146.38	1.06	155.51	1.50	-5.34	-0.43		1.20	21.87	23.07	1.85			
	Asian	3	166.19	2.36	178.60	2.22				2.76						
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	4	154.61	1.80	163.14	2.15				2.24						
Unknown	White	3	130.07	2.30	136.41	3.16				3.30						
	Black	1	112.45	2.77	121.18	4.13				5.62						
	Hispan	4	117.80	1.28	125.51	2.08				1.47						
	Asian	0	143.58	4.64	‡	†				20.09						
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	126.90	4.88	‡	†				11.98						

Appendix C.12

Use to Complete Paper Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer: http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer to complete paper (collapsed) [W810104], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	low use (collapsed)		high use (collapsed)	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	118	(0.7)	133	(0.9)
			Not eligible	137	(1.2)	158	(0.8)
			Information not available	134	(3.0)	161	(2.5)
		Female	Eligible	137	(0.7)	151	(0.7)
			Not eligible	157	(1.1)	176	(0.9)
			Information not available	152	(3.0)	177	(2.6)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR			VARIANC	*test*	*p*
Gender	Natio	Percent	Average scale score	Standard error	Average scale score	Standard error	Difference of Means	Weighted	18.14	Variance	Variance	Variance	2.47	11.53	0.000
Male	Eligibl	21	118.22	0.71	133.09	0.85	14.87	3.12		0.51	0.73	1.24			
	Not el	27	137.45	1.18	157.71	0.79	20.26	5.47		1.40	0.62	2.02			
	Inform	3	133.80	2.98	160.53	2.49	26.73	0.80		8.87	6.22	15.09			
Female	Eligibl	21	136.63	0.72	151.27	0.74	14.63	3.07		0.52	0.55	1.07			
	Not el	26	157.34	1.14	176.31	0.86	18.97	4.93		1.29	0.73	2.02			
	Inform	3	152.23	2.98	176.98	2.58	24.75	0.74		8.90	6.65	15.55			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer to complete paper (collapsed) [W810104], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	121	(1.3)	145	(1.3)
			Suburb	130	(1.4)	154	(1.2)
			Town	128	(1.3)	147	(2.0)
			Rural	129	(1.4)	149	(1.3)
		Female	City	137	(1.4)	163	(1.1)
			Suburb	148	(1.4)	172	(1.3)
			Town	151	(2.1)	164	(1.5)
			Rural	149	(1.6)	167	(1.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	22.61	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.91	**11.43**	**0.000**
Male	City	14	120.71	1.26	145.48	1.33	24.77	3.47		1.58	1.78	3.35	0.47			
	Suburb	19	129.62	1.37	154.18	1.23	24.56	4.67		1.88	1.50	3.39	0.64			
	Town	6	127.95	1.28	146.62	1.97	18.67	1.12		1.64	3.90	5.54	0.33			
	Rural	12	128.79	1.44	148.56	1.34	19.78	2.37		2.07	1.79	3.86	0.46			
Female	City	14	136.62	1.40	163.12	1.06	26.50	3.71		1.97	1.13	3.11	0.43			
	Suburb	19	148.38	1.37	171.97	1.30	23.59	4.48		1.89	1.68	3.57	0.68			
	Town	6	150.85	2.05	163.66	1.49	12.81	0.77		4.22	2.22	6.44	0.39			
	Rural	11	148.74	1.63	167.11	1.39	18.37	2.02		2.67	1.94	4.61	0.51			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer to complete paper (collapsed) [W810104], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	118	(1.4)	131	(2.0)
			Graduated high school	121	(1.2)	136	(1.3)
			Some education after high school	129	(1.5)	146	(1.1)
			Graduated college	136	(1.1)	157	(0.8)
			Unknown	111	(1.6)	124	(1.8)
		Female	Did not finish high school	135	(1.6)	148	(1.8)
			Graduated high school	141	(1.2)	154	(1.1)
			Some education after high school	152	(1.3)	166	(1.1)
			Graduated college	154	(0.9)	176	(0.8)
			Unknown	128	(1.7)	144	(1.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	14.78	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	1.65	**11.49**	**0.000**
Male	Did no	0	118.22	1.39	131.08	1.96	12.86	0.00		1.92	3.83	5.75	0.00			
	Gradu	8	121.01	1.21	135.99	1.33	14.98	1.20		1.46	1.78	3.23	0.26			
	Some	7	128.83	1.46	145.86	1.12	17.03	1.19		2.15	1.26	3.40	0.24			
	Gradu	27	136.33	1.13	157.32	0.81	20.99	5.67		1.28	0.66	1.94	0.52			
	Unkno	0	110.73	1.55	124.32	1.81	13.58	0.00		2.41	3.29	5.70	0.00			
Female	Did no	0	135.43	1.56	147.73	1.77	12.30	0.00		2.44	3.14	5.58	0.00			
	Gradu	0	140.99	1.23	153.75	1.06	12.76	0.00		1.51	1.13	2.64	0.00			
	Some	8	151.77	1.26	165.51	1.12	13.74	1.10		1.59	1.25	2.84	0.23			
	Gradu	26	153.97	0.95	175.58	0.82	21.61	5.62		0.90	0.67	1.56	0.41			
	Unkno	0	127.53	1.74	144.46	1.43	16.93	0.00		3.02	2.05	5.07	0.00			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer to complete paper (collapsed) [W810104], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	134	(1.0)	157	(1.0)
			Black	115	(1.3)	131	(1.2)
			Hispanic	120	(0.8)	138	(0.9)
			Asian	140	(4.4)	165	(1.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	131	(2.2)	148	(1.6)
		Female	White	155	(1.0)	175	(0.9)
			Black	132	(1.8)	147	(1.4)
			Hispanic	137	(0.9)	156	(0.9)
			Asian	158	(3.3)	180	(1.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	153	(2.2)	166	(1.6)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	19.00	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.08	**10.83**	**0.000**
Male	White	26	134.48	1.04	156.79	0.96	22.31	5.80		1.08	0.92	2.00	0.52			
	Black	6	115.11	1.29	131.40	1.24	16.29	0.98		1.66	1.53	3.19	0.19			
	Hispan	13	120.13	0.81	137.80	0.91	17.67	2.30		0.66	0.82	1.49	0.19			
	Asian	2	139.85	4.38	164.71	1.88	24.86	0.50		19.22	3.52	22.74	0.45			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	3	130.58	2.16	148.21	1.62	17.63	0.53		4.67	2.63	7.30	0.22			
Female	White	25	155.26	1.04	174.63	0.89	19.37	4.84		1.08	0.79	1.87	0.47			
	Black	6	132.26	1.79	147.25	1.44	14.99	0.90		3.22	2.06	5.28	0.32			
	Hispan	12	137.19	0.93	156.36	0.87	19.17	2.30		0.87	0.76	1.63	0.20			
	Asian	2	157.85	3.29	180.44	1.91	22.60	0.45		10.84	3.63	14.47	0.29			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	3	152.55	2.22	166.09	1.65	13.54	0.41		4.95	2.71	7.66	0.23			

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer to complete paper (collapsed) [W810104], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	122	(1.0)	139	(1.1)
			Suburb	128	(1.2)	144	(1.1)
			Town	131	(1.2)	145	(2.0)
			Rural	130	(1.3)	145	(1.7)
		Not eligible	City	142	(2.1)	166	(1.2)
			Suburb	148	(1.6)	171	(1.3)
			Town	147	(2.5)	161	(1.4)
			Rural	146	(1.5)	164	(1.2)
		Information not available	City	145	(4.5)	171	(3.8)
			Suburb	144	(5.7)	169	(4.0)
			Town	‡	†	167	(3.2)
			Rural	‡	†	161	(5.0)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	18.49	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.59	**7.82**	**0.000**
Eligible	City	15	121.85	0.99	138.91	1.07	17.06	2.56		0.98	1.14	2.12	0.32			
	Suburb	13	128.50	1.21	144.43	1.09	15.93	2.07		1.47	1.18	2.65	0.34			
	Town	5	130.86	1.19	144.51	1.96	13.64	0.68		1.43	3.85	5.27	0.26			
	Rural	9	130.13	1.33	145.20	1.67	15.07	1.36		1.78	2.79	4.57	0.41			
Not eligible	City	10	141.75	2.10	166.33	1.24	24.58	2.46		4.40	1.53	5.93	0.59			
	Suburb	23	148.48	1.63	170.70	1.32	22.22	5.11		2.65	1.74	4.39	1.01			
	Town	6	147.42	2.50	160.66	1.43	13.24	0.79		6.23	2.04	8.26	0.50			
	Rural	13	145.62	1.52	164.36	1.22	18.74	2.44		2.30	1.49	3.78	0.49			
Information not av	City	2	144.62	4.51	171.05	3.78	26.44	0.53		20.37	14.31	34.68	0.69			
	Suburb	2	143.85	5.72	168.67	3.98	24.82	0.50		32.67	15.83	48.50	0.97			
	Town	1	‡	†	167.01	3.24					10.48					
	Rural	1	‡	†	161.32	5.01					25.12					

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Average scale scores for writing, grade 8 by use computer to complete paper (collapsed) [W810104], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	126	(1.1)	139	(1.5)
			Graduated high school	126	(1.0)	138	(1.0)
			Some education after high school	136	(1.2)	149	(1.1)
			Graduated college	131	(1.0)	148	(1.0)
			Unknown	114	(1.4)	129	(1.5)
		Not eligible	Did not finish high school	135	(3.0)	151	(2.9)
			Graduated high school	140	(2.0)	154	(1.4)
			Some education after high school	146	(1.8)	163	(1.2)
			Graduated college	151	(1.2)	171	(0.8)
			Unknown	128	(1.9)	145	(2.7)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	‡	†	‡	†
			Some education after high school	‡	†	160	(4.2)
			Graduated college	148	(2.5)	171	(2.2)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	16.58	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.43	**8.95**	**0.000**
Eligible	Did no	6	125.85	1.06	138.51	1.53	12.66	0.76		1.12	2.35	3.46	0.21			
	Gradu	10	125.52	0.96	137.91	0.98	12.39	1.24		0.91	0.95	1.86	0.19			
	Some	8	136.01	1.22	148.94	1.11	12.92	1.03		1.49	1.24	2.72	0.22			
	Gradu	13	131.24	0.96	148.22	1.01	16.98	2.21		0.92	1.03	1.95	0.25			
	Unkno	6	114.33	1.38	129.09	1.47	14.76	0.89		1.90	2.17	4.07	0.24			
Not eligible	Did no	1	134.85	2.95	151.04	2.94	16.19	0.16		8.73	8.61	17.35	0.17			
	Gradu	6	140.47	2.00	154.32	1.43	13.85	0.83		3.98	2.05	6.04	0.36			
	Some	7	145.64	1.83	163.01	1.21	17.37	1.22		3.34	1.46	4.80	0.34			
	Gradu	36	151.40	1.21	170.80	0.85	19.40	6.98		1.46	0.72	2.19	0.79			
	Unkno	2	128.10	1.93	144.57	2.69	16.47	0.33		3.74	7.22	10.96	0.22			
Information not a	Did no	0	‡	†	‡	†										
	Gradu	0	‡	†	‡	†										
	Some	1	‡	†	159.73	4.17					17.39					
	Gradu	4	148.15	2.47	171.34	2.23	23.19	0.93		6.11	4.99	11.10	0.44			
	Unkno	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
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Average scale scores for writing, grade 8 by use computer to complete paper (collapsed) [W810104], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	133	(1.2)	151	(1.0)
			Black	120	(1.2)	133	(1.5)
			Hispanic	125	(0.8)	139	(0.9)
			Asian	137	(4.4)	158	(2.4)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	134	(2.4)	147	(1.8)
		Not eligible	White	150	(1.2)	169	(0.9)
			Black	134	(2.2)	150	(1.6)
			Hispanic	138	(1.5)	159	(1.1)
			Asian	159	(4.1)	178	(1.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(2.6)	166	(1.7)
		Information not available	White	147	(3.2)	171	(2.1)
			Black	‡	†	150	(4.3)
			Hispanic	135	(4.6)	163	(3.7)
			Asian	‡	†	180	(4.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	17.07	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.13	**8.41**	**0.000**
Eligible	White	13	133.34	1.25	150.69	1.02	17.35	2.26		1.55	1.03	2.59	0.34			
	Black	8	119.77	1.23	132.86	1.52	13.10	1.05		1.51	2.31	3.82	0.31			
	Hispan	16	124.67	0.76	138.67	0.88	13.99	2.24		0.58	0.77	1.35	0.22			
	Asian	1	137.06	4.38	157.58	2.41	20.53	0.21		19.14	5.83	24.97	0.25			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	134.02	2.45	147.01	1.81	12.99	0.39		5.99	3.27	9.26	0.28			
Not eligible	White	35	149.79	1.16	169.39	0.93	19.60	6.86		1.35	0.86	2.20	0.77			
	Black	3	134.39	2.15	150.28	1.57	15.89	0.48		4.63	2.47	7.10	0.21			
	Hispan	8	138.12	1.47	159.28	1.09	21.16	1.69		2.17	1.19	3.35	0.27			
	Asian	2	159.20	4.07	178.29	1.94	19.09	0.38		16.57	3.78	20.36	0.41			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	148.84	2.62	166.00	1.67	17.17	0.52		6.85	2.80	9.65	0.29			
Information not av	White	3	147.30	3.19	171.49	2.14	24.19	0.73		10.19	4.56	14.75	0.44			
	Black	0	‡	†	150.48	4.32					18.69					
	Hispan	1	134.86	4.57	163.04	3.72	28.18	0.28		20.90	13.86	34.76	0.35			
	Asian	0	‡	†	179.59	4.91					24.13					
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
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National Assessment of Educational Progress (NAEP)
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Average scale scores for writing, grade 8 by use computer to complete paper (collapsed) [W810104], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	123	(2.0)	137	(1.7)
			Graduated high school	124	(1.8)	141	(1.6)
			Some education after high school	133	(1.9)	152	(1.8)
			Graduated college	138	(1.6)	164	(1.2)
			Unknown	114	(2.0)	131	(2.0)
		Suburb	Did not finish high school	129	(2.1)	143	(2.2)
			Graduated high school	133	(1.5)	147	(1.6)
			Some education after high school	139	(1.8)	157	(1.7)
			Graduated college	148	(1.5)	171	(1.2)
			Unknown	120	(2.1)	140	(2.3)
		Town	Did not finish high school	130	(3.5)	143	(6.2)
			Graduated high school	133	(3.0)	144	(2.3)
			Some education after high school	148	(2.9)	160	(2.3)
			Graduated college	143	(2.3)	162	(1.5)
			Unknown	119	(4.1)	128	(4.0)
		Rural	Did not finish high school	132	(2.2)	143	(4.7)
			Graduated high school	132	(2.0)	147	(2.1)
			Some education after high school	142	(1.7)	158	(1.7)
			Graduated college	145	(1.8)	164	(1.4)
			Unknown	121	(2.6)	135	(3.1)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	18.98	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.98	**7.19**	**0.000**
City	Did no	3	122.52	1.99	137.30	1.70	14.79	0.44		3.94	2.90	6.85	0.21			
	Gradu	4	124.03	1.83	140.80	1.60	16.77	0.67		3.36	2.56	5.93	0.24			
	Some	4	133.35	1.88	152.22	1.83	18.87	0.75		3.53	3.35	6.88	0.28			
	Gradu	13	137.97	1.64	163.63	1.18	25.66	3.34		2.70	1.39	4.09	0.53			
	Unkno	3	113.97	2.00	131.12	1.96	17.15	0.51		4.02	3.82	7.84	0.24			
Suburb	Did no	2	129.06	2.12	143.44	2.16	14.39	0.29		4.50	4.66	9.16	0.18			
	Gradu	5	133.13	1.50	147.50	1.57	14.37	0.72		2.26	2.46	4.72	0.24			
	Some	6	139.10	1.82	157.03	1.74	17.93	1.08		3.30	3.03	6.33	0.38			
	Gradu	22	148.22	1.46	170.62	1.19	22.41	4.93		2.14	1.43	3.57	0.78			
	Unkno	3	119.75	2.10	139.78	2.27	20.03	0.60		4.41	5.17	9.58	0.29			
Town	Did no	1	129.79	3.52	142.53	6.22	12.74	0.13		12.42	38.73	51.15	0.51			
	Gradu	2	133.44	2.96	144.05	2.32	10.61	0.21		8.77	5.37	14.14	0.28			
	Some	2	147.97	2.92	160.28	2.33	12.32	0.25		8.53	5.42	13.95	0.28			
	Gradu	6	143.27	2.25	161.57	1.48	18.30	1.10		5.07	2.19	7.26	0.44			
	Unkno	1	118.63	4.09	127.74	3.96	9.11	0.09		16.69	15.70	32.39	0.32			
Rural	Did no	1	131.58	2.15	143.45	4.65	11.87	0.12		4.64	21.63	26.27	0.26			
	Gradu	4	132.02	2.00	146.69	2.06	14.67	0.59		3.99	4.26	8.25	0.33			
	Some	4	142.08	1.71	158.29	1.71	16.21	0.65		2.92	2.91	5.83	0.23			
	Gradu	12	144.89	1.84	163.68	1.40	18.79	2.25		3.40	1.95	5.36	0.64			
	Unkno	2	121.40	2.58	134.79	3.05	13.39	0.27		6.66	9.33	15.99	0.32			

National Center for Education Statistics (NCES)
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Average scale scores for writing, grade 8 by use computer to complete paper (collapsed) [W810104], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	141	(1.7)	167	(1.4)
			Black	120	(1.9)	135	(2.0)
			Hispanic	124	(1.2)	145	(1.3)
			Asian	142	(4.7)	168	(1.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	135	(2.5)	156	(2.1)
		Suburb	White	148	(1.7)	170	(1.4)
			Black	125	(1.9)	144	(1.9)
			Hispanic	130	(1.2)	149	(1.4)
			Asian	159	(4.3)	179	(2.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	145	(3.3)	161	(2.6)
		Town	White	143	(2.0)	160	(1.3)
			Black	‡	†	139	(4.1)
			Hispanic	133	(2.1)	143	(2.4)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	154	(3.2)
		Rural	White	141	(1.4)	161	(1.2)
			Black	128	(3.5)	139	(3.4)
			Hispanic	131	(1.9)	151	(2.0)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	138	(3.0)	156	(2.9)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	19.78	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.48	**7.77**	**0.000**
City	White	9	141.48	1.71	167.48	1.38	26.00	2.34		2.91	1.92	4.83	0.43			
	Black	5	119.99	1.86	135.23	2.00	15.24	0.76		3.47	4.01	7.48	0.37			
	Hispan	10	124.13	1.24	145.39	1.27	21.26	2.13		1.53	1.61	3.14	0.31			
	Asian	2	141.78	4.71	167.52	1.90	25.74	0.51		22.14	3.62	25.76	0.52			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	2	134.87	2.46	155.78	2.09	20.92	0.42		6.07	4.38	10.45	0.21			
Suburb	White	20	147.89	1.68	170.35	1.40	22.46	4.49		2.81	1.95	4.76	0.95			
	Black	4	125.12	1.86	144.04	1.86	18.93	0.76		3.48	3.46	6.93	0.28			
	Hispan	10	130.34	1.20	148.85	1.36	18.51	1.85		1.45	1.84	3.29	0.33			
	Asian	2	158.62	4.28	178.53	2.48	19.91	0.40		18.32	6.13	24.46	0.49			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	144.65	3.25	161.15	2.57	16.49	0.49		10.57	6.58	17.15	0.51			
Town	White	8	142.71	1.99	159.84	1.34	17.14	1.37		3.96	1.81	5.77	0.46			
	Black	1	‡	†	138.67	4.05					16.43					
	Hispan	2	132.51	2.09	143.42	2.42	10.91	0.22		4.36	5.84	10.20	0.20			
	Asian	0	‡	†	‡	†										
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	1	‡	†	154.12	3.18					10.09					
Rural	White	15	141.32	1.44	161.50	1.22	20.18	3.03		2.07	1.48	3.55	0.53			
	Black	2	127.66	3.46	139.26	3.39	11.60	0.23		11.94	11.49	23.43	0.47			
	Hispan	3	130.99	1.86	151.26	2.02	20.27	0.61		3.46	4.09	7.55	0.23			
	Asian	0	‡	†	‡	†										
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	1	138.50	3.01	155.76	2.92	17.26	0.17		9.07	8.51	17.59	0.18			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer to complete paper (collapsed) [W810104], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	132	(2.8)	148	(2.3)
			Black	116	(3.1)	120	(4.9)
			Hispanic	126	(1.5)	139	(1.4)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	137	(1.6)	152	(1.4)
			Black	119	(2.2)	129	(2.1)
			Hispanic	128	(1.5)	139	(1.6)
			Asian	‡	†	159	(5.3)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	133	(3.7)	147	(3.0)
		Some education after high school	White	145	(1.6)	162	(1.1)
			Black	129	(2.2)	144	(2.1)
			Hispanic	138	(1.4)	151	(1.8)
			Asian	‡	†	169	(5.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	145	(3.3)	154	(2.8)
		Graduated college	White	151	(1.0)	171	(0.9)
			Black	129	(1.7)	144	(1.3)
			Hispanic	136	(1.3)	158	(1.2)
			Asian	155	(3.5)	178	(1.7)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	147	(2.5)	163	(1.7)
		Unknown	White	125	(2.5)	140	(2.6)
			Black	109	(3.3)	125	(3.8)
			Hispanic	115	(1.5)	128	(1.6)
			Asian	‡	†	157	(5.7)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	16.65	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.35	7.20	0.000
Did not finish high	White	2	132.20	2.82	147.98	2.29	15.78	0.32		7.95	5.24	13.20	0.26			
	Black	1	116.47	3.12	119.63	4.93	3.16	0.03		9.72	24.26	33.98	0.34			
	Hispan	4	126.11	1.47	139.07	1.37	12.96	0.52		2.15	1.89	4.03	0.16			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										
Graduated high sc	White	7	137.18	1.64	152.39	1.43	15.21	1.06		2.68	2.04	4.72	0.33			
	Black	2	118.68	2.20	129.00	2.13	10.32	0.21		4.83	4.55	9.38	0.19			
	Hispan	5	127.90	1.45	139.21	1.59	11.32	0.57		2.11	2.53	4.64	0.23			
	Asian	0	‡	†	159.30	5.32					28.30					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	132.90	3.69	146.77	3.00	13.87	0.14		13.63	9.00	22.63	0.23			
Some education a	White	7	144.63	1.62	162.21	1.12	17.58	1.23		2.64	1.26	3.90	0.27			
	Black	2	129.32	2.17	143.89	2.13	14.56	0.29		4.71	4.52	9.23	0.18			
	Hispan	4	137.55	1.40	150.85	1.76	13.30	0.53		1.97	3.08	5.05	0.20			
	Asian	0	‡	†	168.50	5.10					25.99					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	144.59	3.26	154.05	2.77	9.46	0.09		10.64	7.68	18.33	0.18			
Graduated college	White	33	150.72	1.05	170.69	0.92	19.97	6.59		1.10	0.85	1.95	0.64			
	Black	5	128.58	1.73	144.41	1.28	15.84	0.79		2.99	1.64	4.64	0.23			
	Hispan	8	135.79	1.33	158.25	1.16	22.46	1.80		1.77	1.34	3.11	0.25			
	Asian	3	155.23	3.45	178.06	1.68	22.83	0.68		11.93	2.81	14.74	0.44			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	4	146.76	2.47	163.08	1.75	16.32	0.65		6.10	3.06	9.16	0.37			
Unknown	White	3	124.75	2.49	139.74	2.58	14.99	0.45		6.19	6.64	12.82	0.38			
	Black	1	108.58	3.34	124.86	3.81	16.27	0.16		11.17	14.54	25.70	0.26			
	Hispan	4	114.92	1.52	128.14	1.57	13.22	0.53		2.30	2.46	4.76	0.19			
	Asian	0	‡	†	156.94	5.68					32.29					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										

Appendix C.13

Make Changes to Paper Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer to make changes to paper (collapsed) [W810103], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	low use (collapsed)		high use (collapsed)	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	120	(0.7)	132	(0.9)
			Not eligible	141	(1.0)	158	(0.8)
			Information not available	141	(3.4)	161	(2.9)
		Female	Eligible	139	(0.8)	150	(0.7)
			Not eligible	160	(1.1)	176	(0.9)
			Information not available	154	(3.9)	178	(2.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANC	*test*	*p*
	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	14.78	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	2.68	9.03	0.000
Gender																
Male	Eligible	21	120.17	0.70	132.23	0.88	12.06	2.53		0.48	0.78	1.26	0.26			
	Not eligible	27	141.48	1.02	157.82	0.83	16.34	4.41		1.05	0.69	1.74	0.47			
	Inform	3	140.93	3.36	160.76	2.86	19.83	0.59		11.27	8.18	19.45	0.58			
Female	Eligible	21	138.84	0.80	150.28	0.71	11.44	2.40		0.64	0.51	1.14	0.24			
	Not eligible	26	160.33	1.05	176.19	0.90	15.86	4.12		1.11	0.81	1.92	0.50			
	Inform	3	154.04	3.89	177.75	2.36	23.70	0.71		15.16	5.57	20.73	0.62			

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer to make changes to paper (collapsed) [W810103], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	125	(1.2)	145	(1.5)
			Suburb	134	(1.5)	154	(1.3)
			Town	131	(1.9)	147	(2.3)
			Rural	132	(1.4)	148	(1.6)
		Female	City	141	(1.4)	162	(1.2)
			Suburb	152	(1.4)	172	(1.3)
			Town	151	(2.2)	164	(1.3)
			Rural	151	(1.8)	167	(1.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	18.99	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.42	**9.03**	**0.000**
Male	City	14	124.72	1.22	144.82	1.45	20.10	2.81		1.48	2.11	3.59	0.50			
	Suburb	19	133.72	1.47	154.19	1.26	20.47	3.89		2.15	1.60	3.75	0.71			
	Town	6	130.56	1.87	146.77	2.25	16.21	0.97		3.51	5.08	8.59	0.52			
	Rural	12	131.89	1.44	148.41	1.58	16.53	1.98		2.08	2.51	4.59	0.55			
Female	City	14	140.85	1.38	162.25	1.18	21.40	3.00		1.89	1.39	3.28	0.46			
	Suburb	19	151.52	1.43	171.87	1.31	20.35	3.87		2.04	1.71	3.76	0.71			
	Town	6	151.31	2.21	164.20	1.31	12.89	0.77		4.89	1.72	6.62	0.40			
	Rural	11	151.15	1.78	166.53	1.42	15.38	1.69		3.17	2.02	5.20	0.57			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer to make changes to paper (collapsed) [W810103], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	122	(1.4)	127	(2.0)
			Graduated high school	123	(1.2)	136	(1.4)
			Some education after high school	132	(1.3)	145	(1.2)
			Graduated college	141	(1.0)	157	(0.9)
			Unknown	111	(1.5)	125	(1.8)
		Female	Did not finish high school	137	(1.5)	148	(1.9)
			Graduated high school	142	(1.2)	154	(1.1)
			Some education after high school	154	(1.1)	165	(1.2)
			Graduated college	159	(1.1)	175	(0.9)
			Unknown	129	(1.6)	144	(1.6)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	11.58	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	1.73	**8.80**	**0.000**
Male	Did no	0	121.68	1.44	126.71	2.00	5.03	0.00		2.06	4.01	6.07	0.00			
	Gradu	8	122.99	1.22	135.57	1.37	12.58	1.01		1.49	1.87	3.36	0.27			
	Some	7	131.53	1.35	145.40	1.15	13.87	0.97		1.82	1.33	3.15	0.22			
	Gradu	27	140.66	1.00	157.40	0.89	16.74	4.52		1.01	0.79	1.80	0.49			
	Unkno	0	111.34	1.50	125.01	1.80	13.67	0.00		2.26	3.23	5.49	0.00			
Female	Did no	0	136.61	1.47	147.83	1.93	11.22	0.00		2.17	3.74	5.91	0.00			
	Gradu	0	141.77	1.21	154.16	1.09	12.39	0.00		1.47	1.18	2.65	0.00			
	Some	8	154.30	1.14	164.91	1.23	10.61	0.85		1.30	1.51	2.81	0.22			
	Gradu	26	158.65	1.14	174.93	0.87	16.28	4.23		1.30	0.75	2.05	0.53			
	Unkno	0	128.56	1.57	144.08	1.55	15.52	0.00		2.48	2.41	4.89	0.00			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by use computer to make changes to paper (collapsed) [W810103], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	138	(1.0)	157	(1.0)
			Black	117	(1.3)	130	(1.5)
			Hispanic	123	(0.9)	137	(1.0)
			Asian	147	(4.0)	164	(2.0)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	134	(2.0)	148	(1.7)
		Female	White	159	(0.9)	175	(0.9)
			Black	133	(2.0)	147	(1.4)
			Hispanic	139	(1.0)	156	(1.0)
			Asian	159	(4.3)	180	(1.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	156	(2.2)	165	(1.5)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	15.98	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.29	**8.81**	**0.000**
Male	White	26	138.10	0.98	157.34	1.04	19.25	5.00		0.96	1.07	2.04	0.53			
	Black	6	117.03	1.33	130.23	1.51	13.19	0.79		1.77	2.28	4.05	0.24			
	Hispan	13	122.60	0.94	136.85	0.96	14.25	1.85		0.88	0.92	1.80	0.23			
	Asian	2	147.34	4.05	164.06	1.97	16.71	0.33		16.40	3.88	20.28	0.41			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	3	133.98	2.02	148.17	1.75	14.20	0.43		4.08	3.05	7.13	0.21			
Female	White	25	158.59	0.95	174.62	0.89	16.03	4.01		0.90	0.80	1.70	0.42			
	Black	6	132.58	2.02	147.22	1.40	14.64	0.88		4.06	1.97	6.03	0.36			
	Hispan	12	139.28	0.97	155.84	0.97	16.56	1.99		0.93	0.93	1.87	0.22			
	Asian	2	159.12	4.25	180.30	1.91	21.18	0.42		18.08	3.63	21.71	0.43			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	3	155.77	2.24	164.96	1.52	9.19	0.28		5.04	2.32	7.36	0.22			

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Average scale scores for writing, grade 8 by use computer to make changes to paper (collapsed) [W810103], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	125	(1.0)	137	(1.1)
			Suburb	130	(1.2)	144	(1.0)
			Town	132	(1.3)	144	(2.0)
			Rural	132	(1.4)	145	(1.9)
		Not eligible	City	147	(1.6)	166	(1.2)
			Suburb	152	(1.6)	171	(1.4)
			Town	148	(2.1)	162	(1.2)
			Rural	148	(1.5)	165	(1.3)
		Information not available	City	146	(4.7)	172	(4.0)
			Suburb	150	(6.6)	169	(4.2)
			Town	‡	†	168	(4.3)
			Rural	‡	†	162	(5.9)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	15.62	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.75	**6.51**	**0.000**
Eligible	City	15	124.74	0.98	137.26	1.13	12.52	1.88		0.96	1.27	2.24	0.34			
	Suburb	13	129.82	1.16	144.45	1.04	14.62	1.90		1.35	1.08	2.42	0.31			
	Town	5	131.75	1.29	144.41	2.03	12.66	0.63		1.67	4.13	5.81	0.29			
	Rural	9	131.96	1.43	144.56	1.86	12.60	1.13		2.03	3.47	5.50	0.50			
Not eligible	City	10	147.04	1.63	166.08	1.25	19.04	1.90		2.67	1.55	4.22	0.42			
	Suburb	23	152.41	1.62	170.91	1.37	18.50	4.25		2.61	1.86	4.47	1.03			
	Town	6	147.51	2.09	162.07	1.18	14.56	0.87		4.39	1.38	5.77	0.35			
	Rural	13	148.09	1.54	164.51	1.34	16.42	2.13		2.36	1.80	4.16	0.54			
Information not av	City	2	146.25	4.70	172.02	3.97	25.76	0.52		22.12	15.74	37.86	0.76			
	Suburb	2	149.76	6.59	169.18	4.18	19.42	0.39		43.38	17.48	60.86	1.22			
	Town	1	‡	†	168.48	4.29					18.40					
	Rural	1	‡	†	161.51	5.89					34.70					

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Average scale scores for writing, grade 8 by use computer to make changes to paper (collapsed) [W810103], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	128	(1.1)	137	(1.7)
			Graduated high school	127	(1.0)	138	(1.0)
			Some education after high school	138	(1.2)	148	(1.0)
			Graduated college	134	(0.9)	147	(1.0)
			Unknown	115	(1.4)	129	(1.4)
		Not eligible	Did not finish high school	137	(2.6)	151	(3.2)
			Graduated high school	142	(1.6)	155	(1.6)
			Some education after high school	148	(1.7)	164	(1.3)
			Graduated college	155	(1.2)	171	(0.9)
			Unknown	128	(2.3)	145	(2.9)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	‡	†	‡	†
			Some education after high school	‡	†	160	(4.1)
			Graduated college	153	(3.1)	172	(2.4)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	13.75	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.56	**7.29**	**0.000**
Eligible	Did no	6	127.92	1.11	136.77	1.66	8.85	0.53		1.23	2.77	4.00	0.24			
	Gradu	10	126.82	1.04	137.72	1.03	10.90	1.09		1.08	1.07	2.15	0.21			
	Some	8	137.85	1.16	147.89	0.98	10.04	0.80		1.36	0.96	2.31	0.19			
	Gradu	13	134.14	0.85	147.35	1.02	13.21	1.72		0.73	1.04	1.77	0.23			
	Unkno	6	115.09	1.39	129.28	1.36	14.19	0.85		1.93	1.85	3.78	0.23			
Not eligible	Did no	1	137.17	2.64	151.13	3.21	13.96	0.14		6.94	10.32	17.26	0.17			
	Gradu	6	141.50	1.65	154.71	1.57	13.21	0.79		2.71	2.46	5.17	0.31			
	Some	7	148.23	1.70	163.60	1.29	15.37	1.08		2.90	1.65	4.56	0.32			
	Gradu	36	155.16	1.20	170.94	0.86	15.78	5.68		1.43	0.74	2.17	0.78			
	Unkno	2	128.47	2.32	144.98	2.90	16.51	0.33		5.37	8.43	13.80	0.28			
Information not av	Did no	0	‡	†	‡	†										
	Gradu	0	‡	†	‡	†										
	Some	1	‡	†	159.93	4.05					16.42					
	Gradu	4	153.22	3.05	171.65	2.37	18.43	0.74		9.32	5.63	14.96	0.60			
	Unkno	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by use computer to make changes to paper (collapsed) [W810103], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	136	(1.1)	151	(1.0)
			Black	121	(1.4)	132	(1.3)
			Hispanic	126	(0.8)	138	(1.0)
			Asian	140	(4.4)	157	(2.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	135	(2.3)	147	(1.8)
		Not eligible	White	153	(1.1)	170	(1.0)
			Black	134	(2.2)	151	(1.7)
			Hispanic	141	(1.4)	159	(1.1)
			Asian	161	(4.1)	179	(2.0)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	153	(2.6)	166	(1.6)
		Information not available	White	151	(4.0)	172	(2.3)
			Black	‡	†	‡	†
			Hispanic	139	(5.6)	163	(4.0)
			Asian	‡	†	179	(6.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	14.60	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.39	**6.97**	**0.000**
Eligible	White	13	135.77	1.12	150.75	1.05	14.98	1.95		1.26	1.09	2.36	0.31			
	Black	8	120.87	1.44	131.72	1.28	10.85	0.87		2.07	1.64	3.71	0.30			
	Hispan	16	126.15	0.80	138.03	0.98	11.89	1.90		0.65	0.96	1.61	0.26			
	Asian	1	139.70	4.35	157.15	2.54	17.45	0.17		18.93	6.44	25.36	0.25			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	134.84	2.27	147.15	1.85	12.31	0.37		5.17	3.42	8.59	0.26			
Not eligible	White	35	153.06	1.07	169.75	0.97	16.69	5.84		1.14	0.93	2.07	0.73			
	Black	3	134.03	2.24	151.50	1.67	17.46	0.52		5.01	2.79	7.80	0.23			
	Hispan	8	141.48	1.44	158.74	1.14	17.26	1.38		2.06	1.31	3.37	0.27			
	Asian	2	161.17	4.09	178.72	1.99	17.55	0.35		16.71	3.95	20.65	0.41			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	152.79	2.58	165.62	1.64	12.84	0.39		6.66	2.70	9.36	0.28			
Information not av	White	3	151.48	3.95	171.98	2.26	20.50	0.61		15.62	5.09	20.71	0.62			
	Black	0	‡	†	‡	†										
	Hispan	1	138.92	5.57	163.28	3.99	24.36	0.24		31.05	15.96	47.01	0.47			
	Asian	0	‡	†	179.11	6.12					37.45					
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by use computer to make changes to paper (collapsed) [W810103], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	126	(1.8)	134	(2.2)
			Graduated high school	126	(1.5)	141	(1.6)
			Some education after high school	138	(1.7)	151	(1.7)
			Graduated college	143	(1.6)	163	(1.2)
			Unknown	116	(1.9)	129	(1.8)
		Suburb	Did not finish high school	131	(2.3)	142	(2.7)
			Graduated high school	136	(1.7)	147	(1.5)
			Some education after high school	141	(2.0)	157	(1.6)
			Graduated college	153	(1.6)	171	(1.3)
			Unknown	119	(2.1)	143	(1.9)
		Town	Did not finish high school	130	(4.5)	‡	†
			Graduated high school	132	(3.0)	147	(2.1)
			Some education after high school	149	(1.8)	161	(2.7)
			Graduated college	147	(1.9)	161	(1.3)
			Unknown	120	(3.4)	‡	†
		Rural	Did not finish high school	133	(2.3)	142	(5.4)
			Graduated high school	133	(1.7)	147	(2.5)
			Some education after high school	143	(1.9)	158	(1.9)
			Graduated college	148	(1.8)	164	(1.6)
			Unknown	122	(3.1)	135	(2.9)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	15.42	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.26	**6.16**	**0.000**
City	Did no	3	126.23	1.76	134.36	2.21				3.10	4.87	7.96	0.24			
	Gradu	4	125.91	1.51	140.65	1.60	14.42	0.58		2.27	2.55	4.82	0.19			
	Some	4	138.49	1.67	150.56	1.73	12.07	0.48		2.80	2.98	5.77	0.23			
	Gradu	13	142.62	1.58	163.26	1.22	20.65	2.68		2.50	1.50	4.00	0.52			
	Unkno	3	115.73	1.90	129.47	1.84	13.75	0.41		3.62	3.37	6.99	0.21			
Suburb	Did no	2	130.90	2.29	142.46	2.69	11.56	0.23		5.24	7.25	12.49	0.25			
	Gradu	5	135.52	1.71	146.65	1.52	11.13	0.56		2.92	2.30	5.22	0.26			
	Some	6	141.34	1.98	157.26	1.63	15.92	0.96		3.93	2.67	6.60	0.40			
	Gradu	22	152.71	1.56	170.70	1.26	17.98	3.96		2.43	1.58	4.01	0.88			
	Unkno	3	118.90	2.09	142.50	1.95	23.60	0.71		4.35	3.79	8.14	0.24			
Town	Did no	1	130.02	4.47	‡	†				19.99						
	Gradu	2	131.90	2.95	147.30	2.12	15.40	0.31		8.72	4.49	13.20	0.26			
	Some	2	149.14	1.81	160.72	2.75	11.58	0.23		3.29	7.55	10.84	0.22			
	Gradu	6	146.81	1.86	161.07	1.33	14.26	0.86		3.46	1.76	5.21	0.31			
	Unkno	1	120.13	3.39	‡	†				11.51						
Rural	Did no	1	133.23	2.31	141.87	5.43	8.65	0.09		5.32	29.48	34.80	0.35			
	Gradu	4	133.00	1.72	147.05	2.49	14.05	0.56		2.97	6.20	9.17	0.37			
	Some	4	143.37	1.89	157.75	1.87	14.38	0.58		3.59	3.51	7.10	0.28			
	Gradu	12	147.62	1.83	164.16	1.55	16.54	1.98		3.36	2.42	5.78	0.69			
	Unkno	2	122.23	3.07	134.67	2.85	12.45	0.25		9.44	8.13	17.57	0.35			

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Average scale scores for writing, grade 8 by use computer to make changes to paper (collapsed) [W810103], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				low use (collapsed)		high use (collapsed)	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	147	(1.8)	168	(1.4)
			Black	122	(2.0)	134	(2.1)
			Hispanic	127	(1.3)	144	(1.3)
			Asian	146	(3.9)	167	(2.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	138	(2.9)	156	(1.8)
		Suburb	White	152	(1.7)	170	(1.4)
			Black	125	(1.7)	145	(2.0)
			Hispanic	132	(1.4)	149	(1.4)
			Asian	161	(4.7)	180	(2.4)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(3.0)	161	(2.4)
		Town	White	143	(1.8)	161	(1.3)
			Black	‡	†	136	(4.0)
			Hispanic	135	(2.4)	142	(2.5)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	155	(2.7)
		Rural	White	144	(1.5)	162	(1.4)
			Black	126	(3.5)	140	(3.5)
			Hispanic	133	(2.0)	149	(2.1)
			Asian	‡	†	178	(3.2)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	141	(3.5)	156	(2.9)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	-2.97	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of	15.78	-0.75	0.455
City	White	9	160.58	1.45	151.45	6.78	-9.13	-0.82		2.11	45.91	48.02	4.32			
	Black	5	127.28	1.81	‡	†				3.27						
	Hispan	10	135.21	1.20	124.36	3.71	-10.84	-1.08		1.45	13.77	15.22	1.52			
	Asian	2	161.64	2.40	‡	†				5.78						
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	2	148.85	1.84	‡	†				3.39						
Suburb	White	20	164.91	1.42	159.89	3.97	-5.03	-1.01		2.03	15.77	17.80	3.56			
	Black	4	135.72	1.57	‡	†				2.47						
	Hispan	10	140.59	1.19	133.73	5.52	-6.86	-0.69		1.41	30.49	31.89	3.19			
	Asian	2	174.57	2.50	‡	†				6.27						
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	156.59	2.19	‡	†				4.79						
Town	White	8	153.81	1.28	‡	†				1.65						
	Black	1	131.54	2.98	‡	†				8.89						
	Hispan	2	137.32	1.63	‡	†				2.65						
	Asian	0	‡	†	‡	†										
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	1	151.05	3.20	‡	†				10.22						
Rural	White	15	153.91	1.34	158.13	4.41	4.22	0.63		1.79	19.44	21.23	3.18			
	Black	2	133.74	3.59	‡	†				12.89						
	Hispan	3	141.07	1.61	‡	†				2.59						
	Asian	0	173.87	2.90	‡	†				8.42						
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	1	149.23	2.48	‡	†				6.17						

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Average scale scores for writing, grade 8 by use computer to make changes to paper (collapsed) [W810103], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	low use (collapsed)		high use (collapsed)	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	135	(2.5)	147	(3.1)
			Black	118	(3.2)	117	(4.7)
			Hispanic	128	(1.5)	138	(1.6)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	139	(1.3)	153	(1.5)
			Black	119	(2.0)	129	(2.7)
			Hispanic	130	(1.3)	138	(1.8)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	131	(3.9)	149	(3.1)
		Some education after high school	White	148	(1.5)	162	(1.3)
			Black	130	(2.4)	144	(2.0)
			Hispanic	139	(1.5)	150	(1.9)
			Asian	‡	†	172	(5.1)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	145	(3.7)	154	(2.4)
		Graduated college	White	154	(1.1)	171	(0.9)
			Black	130	(1.9)	144	(1.4)
			Hispanic	140	(1.4)	158	(1.2)
			Asian	161	(3.8)	177	(1.6)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	150	(2.4)	163	(1.6)
		Unknown	White	124	(2.3)	143	(2.7)
			Black	110	(3.2)	123	(3.4)
			Hispanic	115	(1.4)	129	(1.6)
			Asian	140	(4.4)	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	14.13	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.61	**5.97**	**0.000**
Did not finish high	White	2	134.65	2.50	146.77	3.11	12.11	0.24		6.24	9.68	15.92	0.32			
	Black	1	117.73	3.16	117.28	4.75	-0.44	0.00		9.98	22.55	32.53	0.33			
	Hispan	4	127.97	1.50	138.14	1.57	10.18	0.41		2.26	2.46	4.72	0.19			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										
Graduated high sc	White	7	138.55	1.34	152.78	1.53	14.22	1.00		1.78	2.34	4.12	0.29			
	Black	2	118.91	1.99	129.34	2.69	10.43	0.21		3.97	7.23	11.20	0.22			
	Hispan	5	129.74	1.33	138.30	1.79	8.56	0.43		1.77	3.20	4.96	0.25			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	131.04	3.94	148.50	3.14	17.46	0.17		15.51	9.86	25.37	0.25			
Some education a	White	7	148.40	1.47	162.07	1.33	13.67	0.96		2.17	1.77	3.94	0.28			
	Black	2	129.95	2.35	143.95	2.01	14.01	0.28		5.54	4.04	9.57	0.19			
	Hispan	4	138.83	1.55	150.11	1.88	11.27	0.45		2.40	3.54	5.94	0.24			
	Asian	0	‡	†	171.60	5.06					25.65					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	144.85	3.67	154.09	2.41	9.24	0.09		13.48	5.82	19.30	0.19			
Graduated college	White	33	154.37	1.08	171.08	0.95	16.71	5.52		1.17	0.90	2.06	0.68			
	Black	5	130.04	1.94	143.83	1.42	13.80	0.69		3.75	2.03	5.78	0.29			
	Hispan	8	139.67	1.37	157.60	1.22	17.93	1.43		1.87	1.50	3.37	0.27			
	Asian	3	161.03	3.84	177.34	1.63	16.31	0.49		14.75	2.66	17.42	0.52			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	4	150.07	2.36	163.13	1.58	13.06	0.52		5.58	2.49	8.08	0.32			
Unknown	White	3	123.57	2.32	142.90	2.75	19.32	0.58		5.39	7.54	12.92	0.39			
	Black	1	109.61	3.17	123.16	3.37	13.56	0.14		10.07	11.32	21.39	0.21			
	Hispan	4	115.32	1.40	128.62	1.57	13.30	0.53		1.97	2.47	4.44	0.18			
	Asian	0	139.84	4.44	‡	†				19.75						
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										

Appendix C.14

Organize First Writing Task Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer: http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the first writing task [W810001], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	Yes		No	
				Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	121	(0.9)	128	(0.7)
			Not eligible	146	(1.0)	154	(1.0)
			Information not available	150	(3.1)	156	(2.7)
		Female	Eligible	139	(1.0)	148	(0.7)
			Not eligible	168	(1.0)	173	(0.9)
			Information not available	172	(3.4)	171	(2.8)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR													VARIANCE OF EFFECT	*test statistic*	*p*
	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.36	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means										2.68	4.50	0.000
Gender	Eligible	21	120.58	0.92	128.25	0.74	7.67	1.61		0.85	0.55	1.41	0.30												
Male	Not eligible	27	145.51	0.96	154.20	1.00	8.69	2.35		0.91	1.00	1.91	0.52												
	Information not available	3	150.46	3.06	156.21	2.73	5.75	0.17		9.39	7.48	16.87	0.51												
	Eligible	21	139.13	1.03	147.72	0.68	8.58	1.80		1.05	0.46	1.52	0.32												
Female	Not eligible	26	167.79	0.96	173.31	0.95	5.52	1.44		0.93	0.90	1.82	0.47												
	Information not available	3	171.55	3.39	171.46	2.77	-0.09	0.00		11.47	7.68	19.14	0.57												

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the first writing task [W810001], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				Yes		No	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	129	(1.6)	140	(1.3)
			Suburb	138	(1.5)	149	(1.4)
			Town	133	(2.2)	141	(2.1)
			Rural	135	(1.7)	143	(1.5)
		Female	City	147	(1.5)	156	(1.4)
			Suburb	159	(1.6)	168	(1.3)
			Town	155	(2.3)	161	(1.3)
			Rural	156	(2.0)	162	(1.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	9.23	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.08	**4.10**	**0.000**
Male	City	14	128.57	1.60	139.72	1.33	11.15	1.56		2.57	1.77	4.34	0.61			
	Suburb	19	138.20	1.53	149.31	1.36	11.11	2.11		2.34	1.86	4.20	0.80			
	Town	6	132.88	2.21	141.21	2.09	8.34	0.50		4.88	4.36	9.24	0.55			
	Rural	12	134.82	1.69	142.69	1.52	7.87	0.94		2.85	2.30	5.15	0.62			
Female	City	14	147.28	1.53	156.48	1.38	9.20	1.29		2.34	1.90	4.24	0.59			
	Suburb	19	158.90	1.63	168.26	1.35	9.35	1.78		2.67	1.81	4.48	0.85			
	Town	6	155.17	2.33	161.50	1.29	6.32	0.38		5.44	1.66	7.10	0.43			
	Rural	11	156.24	1.97	162.26	1.35	6.03	0.66		3.87	1.83	5.70	0.63			

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the first writing task [W810001], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				Yes		No	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	119	(2.1)	126	(1.4)
			Graduated high school	122	(1.4)	132	(1.3)
			Some education after high school	135	(1.6)	141	(1.1)
			Graduated college	144	(1.2)	155	(0.9)
			Unknown	112	(1.9)	118	(1.4)
		Female	Did not finish high school	135	(2.2)	145	(1.2)
			Graduated high school	143	(1.3)	151	(1.0)
			Some education after high school	157	(1.5)	163	(1.1)
			Graduated college	166	(0.8)	173	(0.9)
			Unknown	128	(2.0)	139	(1.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			**Control Group**		**Treatment Group**		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	***test statistic***	*p*
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.49	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	1.79	**4.85**	**0.000**
Male	Did no	0	118.62	2.05	125.99	1.45	7.37	0.00		4.20	2.09	6.30	0.00			
	Gradu	8	122.37	1.36	131.87	1.34	9.50	0.76		1.84	1.80	3.64	0.29			
	Some	7	134.95	1.64	140.96	1.06	6.00	0.42		2.70	1.13	3.84	0.27			
	Gradu	27	143.75	1.17	154.73	0.90	10.98	2.96		1.37	0.81	2.17	0.59			
	Unkno	0	112.06	1.93	118.31	1.35	6.25	0.00		3.74	1.83	5.56	0.00			
Female	Did no	0	134.54	2.19	144.84	1.16	10.30	0.00		4.81	1.35	6.16	0.00			
	Gradu	0	142.50	1.27	151.16	1.04	8.66	0.00		1.61	1.07	2.68	0.00			
	Some	8	156.68	1.45	162.52	1.08	5.85	0.47		2.11	1.16	3.26	0.26			
	Gradu	26	165.63	0.81	172.85	0.91	7.23	1.88		0.66	0.82	1.48	0.38			
	Unkno	0	127.65	2.04	139.16	1.43	11.51	0.00		4.15	2.03	6.18	0.00			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the first writing task [W810001], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				Yes		No	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	144	(1.1)	152	(1.0)
			Black	120	(1.4)	126	(1.5)
			Hispanic	123	(1.4)	133	(0.8)
			Asian	151	(3.4)	161	(2.3)
			American Indian/Alaska Native	‡	†	131	(4.3)
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	136	(2.4)	144	(1.6)
		Female	White	165	(1.0)	171	(0.9)
			Black	135	(1.8)	144	(1.6)
			Hispanic	142	(1.3)	151	(0.9)
			Asian	169	(3.4)	179	(1.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	158	(1.9)	164	(1.7)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.60	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.42	**4.11**	**0.000**
Male	White	26	144.17	1.14	151.81	1.04	7.64	1.99		1.30	1.09	2.38	0.62			
	Black	6	119.77	1.35	126.24	1.45	6.47	0.39		1.83	2.11	3.94	0.24			
	Hispan	13	122.78	1.41	132.76	0.85	9.98	1.30		1.99	0.71	2.70	0.35			
	Asian	2	151.03	3.41	161.50	2.35	10.47	0.21		11.64	5.51	17.15	0.34			
	Ameri	0	‡	†	131.16	4.34					18.80					
	Native	0	‡	†	‡	†										
	Two o	3	135.92	2.44	144.29	1.64	8.37	0.25		5.95	2.70	8.65	0.26			
Female	White	25	165.46	1.00	171.27	0.90	5.81	1.45		1.00	0.80	1.80	0.45			
	Black	6	134.99	1.81	143.82	1.63	8.83	0.53		3.27	2.65	5.92	0.36			
	Hispan	12	141.61	1.31	151.01	0.90	9.40	1.13		1.71	0.81	2.51	0.30			
	Asian	2	168.94	3.39	178.51	1.87	9.57	0.19		11.52	3.48	15.01	0.30			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	158.49	1.92	164.14	1.74	5.65	0.17		3.67	3.01	6.69	0.20			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the first writing task [W810001], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				Yes		No	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	125	(1.2)	134	(1.0)
			Suburb	132	(1.3)	140	(1.0)
			Town	134	(2.4)	140	(1.4)
			Rural	133	(1.6)	140	(1.6)
		Not eligible	City	155	(1.8)	162	(1.4)
			Suburb	159	(1.6)	168	(1.4)
			Town	153	(2.3)	158	(1.8)
			Rural	155	(1.9)	160	(1.3)
		Information not available	City	160	(4.5)	166	(4.6)
			Suburb	161	(5.7)	166	(4.4)
			Town	‡	†	157	(3.9)
			Rural	‡	†	158	(4.9)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			**Control Group**		**Treatment Group**		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	***test statistic***	***p***
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.17	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	6.19	**2.88**	**0.004**
Eligible	City	15	124.52	1.18	134.32	0.98	9.80	1.47		1.40	0.96	2.36	0.35			
	Suburb	13	131.86	1.27	140.01	1.04	8.15	1.06		1.62	1.08	2.70	0.35			
	Town	5	134.18	2.44	139.81	1.39	5.63	0.28		5.94	1.92	7.86	0.39			
	Rural	9	132.98	1.59	139.93	1.62	6.96	0.63		2.52	2.61	5.13	0.46			
Not eligible	City	10	155.20	1.78	162.04	1.35	6.84	0.68		3.16	1.82	4.98	0.50			
	Suburb	23	159.41	1.62	167.89	1.42	8.48	1.95		2.61	2.02	4.63	1.07			
	Town	6	153.16	2.33	158.14	1.82	4.98	0.30		5.41	3.32	8.73	0.52			
	Rural	13	155.13	1.88	159.52	1.29	4.39	0.57		3.53	1.67	5.20	0.68			
Information not av	City	2	160.05	4.47	166.36	4.61	6.31	0.13		20.02	21.26	41.28	0.83			
	Suburb	2	160.83	5.75	165.81	4.37	4.98	0.10		33.04	19.09	52.13	1.04			
	Town	1	‡	†	156.53	3.88					15.07					
	Rural	1	‡	†	158.23	4.90					24.03					

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the first writing task [W810001], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				Yes		No	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	126	(1.8)	134	(1.2)
			Graduated high school	128	(1.2)	134	(0.9)
			Some education after high school	139	(1.5)	146	(1.0)
			Graduated college	135	(1.2)	145	(0.9)
			Unknown	113	(1.4)	124	(1.2)
		Not eligible	Did not finish high school	134	(3.2)	147	(2.2)
			Graduated high school	141	(1.8)	152	(1.5)
			Some education after high school	154	(1.9)	159	(1.5)
			Graduated college	162	(0.9)	168	(1.0)
			Unknown	133	(2.9)	138	(2.1)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	‡	†	148	(5.4)
			Some education after high school	‡	†	155	(4.2)
			Graduated college	165	(2.9)	168	(2.5)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.21	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.65	**3.78**	**0.000**
Eligible	Did no	6	126.07	1.78	134.30	1.17	8.23	0.49		3.16	1.36	4.52	0.27			
	Gradu	10	127.91	1.15	133.82	0.93	5.91	0.59		1.33	0.86	2.20	0.22			
	Some	8	138.74	1.48	145.65	1.01	6.91	0.55		2.20	1.01	3.21	0.26			
	Gradu	13	134.77	1.25	145.46	0.87	10.69	1.39		1.56	0.75	2.31	0.30			
	Unkno	6	113.39	1.43	123.79	1.23	10.40	0.62		2.03	1.52	3.55	0.21			
Not eligible	Did no	1	134.06	3.17	146.80	2.23	12.75	0.13		10.05	4.97	15.02	0.15			
	Gradu	6	140.75	1.81	152.12	1.55	11.37	0.68		3.27	2.39	5.66	0.34			
	Some	7	153.97	1.87	159.11	1.45	5.13	0.36		3.50	2.11	5.61	0.39			
	Gradu	36	162.25	0.95	168.32	0.97	6.07	2.19		0.90	0.95	1.85	0.67			
	Unkno	2	133.25	2.89	137.61	2.09	4.36	0.09		8.35	4.37	12.72	0.25			
Information not av	Did no	0	‡	†	‡	†										
	Gradu	0	‡	†	148.33	5.45					29.69					
	Some	1	‡	†	154.99	4.20					17.64					
	Gradu	4	165.26	2.86	168.12	2.54	2.87	0.11		8.17	6.43	14.60	0.58			
	Unkno	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
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This report was generated using the NAEP Data Explorer, http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the first writing task [W810001], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				Yes		No	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	139	(1.2)	145	(1.1)
			Black	122	(1.3)	129	(1.5)
			Hispanic	126	(1.1)	135	(0.7)
			Asian	142	(4.1)	155	(2.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	138	(2.4)	144	(2.0)
		Not eligible	White	161	(1.0)	166	(1.0)
			Black	139	(2.1)	148	(1.8)
			Hispanic	144	(1.6)	155	(1.1)
			Asian	168	(2.8)	177	(2.0)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	157	(2.5)	163	(1.7)
		Information not available	White	165	(2.7)	167	(2.7)
			Black	‡	†	147	(4.4)
			Hispanic	151	(6.1)	156	(3.4)
			Asian	‡	†	172	(5.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.41	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.14	**3.15**	**0.002**
Eligible	White	13	138.62	1.20	145.06	1.12	6.44	0.84		1.44	1.25	2.69	0.35			
	Black	8	121.83	1.34	129.04	1.46	7.22	0.58		1.81	2.14	3.94	0.32			
	Hispan	16	125.90	1.08	134.52	0.74	8.62	1.38		1.17	0.54	1.71	0.27			
	Asian	1	141.53	4.12	155.08	2.52	13.55	0.14		16.95	6.37	23.32	0.23			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	3	137.53	2.37	144.01	1.96	6.48	0.19		5.60	3.82	9.43	0.28			
Not eligible	White	35	161.00	0.99	165.94	1.03	4.94	1.73		0.99	1.06	2.05	0.72			
	Black	3	139.29	2.06	147.55	1.79	8.26	0.25		4.24	3.21	7.45	0.22			
	Hispan	8	144.35	1.64	154.66	1.06	10.30	0.82		2.68	1.13	3.80	0.30			
	Asian	2	168.07	2.85	177.48	1.98	9.42	0.19		8.11	3.93	12.04	0.24			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	3	157.14	2.49	163.28	1.75	6.13	0.18		6.22	3.06	9.28	0.28			
Information not a	White	3	165.25	2.65	167.47	2.72	2.23	0.07		7.04	7.43	14.47	0.43			
	Black	0	‡	†	146.70	4.45					19.77					
	Hispan	1	151.30	6.10	156.15	3.42	4.85	0.05		37.18	11.67	48.85	0.49			
	Asian	0	‡	†	172.29	5.50					30.28					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by used the computer to organize writing for the first writing task [W810001], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				Yes		No	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	123	(2.3)	133	(1.8)
			Graduated high school	127	(1.8)	136	(1.4)
			Some education after high school	141	(2.2)	148	(1.4)
			Graduated college	149	(1.6)	161	(1.4)
			Unknown	115	(2.2)	124	(2.0)
		Suburb	Did not finish high school	126	(2.8)	141	(1.8)
			Graduated high school	135	(1.7)	145	(1.6)
			Some education after high school	145	(2.3)	153	(1.7)
			Graduated college	160	(1.5)	168	(1.3)
			Unknown	122	(2.8)	132	(1.7)
		Town	Did not finish high school	‡	†	135	(4.3)
			Graduated high school	134	(3.4)	141	(2.5)
			Some education after high school	150	(3.2)	159	(2.0)
			Graduated college	152	(2.4)	158	(1.6)
			Unknown	118	(4.8)	125	(3.5)
		Rural	Did not finish high school	135	(3.1)	137	(3.3)
			Graduated high school	134	(2.3)	143	(2.0)
			Some education after high school	149	(2.5)	152	(1.9)
			Graduated college	154	(2.1)	160	(1.5)
			Unknown	122	(2.9)	129	(2.5)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	8.29	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.32	3.06	0.002
City	Did no	3	123.09	2.27	133.02	1.82	9.93	0.30		5.14	3.33	8.47	0.25			
	Gradu	4	127.11	1.76	135.61	1.42	8.50	0.34		3.10	2.01	5.10	0.20			
	Some	4	141.19	2.23	147.67	1.38	6.48	0.26		4.97	1.89	6.86	0.27			
	Gradu	13	148.55	1.61	160.78	1.36	12.22	1.59		2.60	1.86	4.46	0.58			
	Unkno	3	115.28	2.21	124.18	1.97	8.89	0.27		4.87	3.87	8.74	0.26			
Suburb	Did no	2	126.03	2.82	141.23	1.76	15.20	0.30		7.97	3.11	11.07	0.22			
	Gradu	5	134.70	1.71	144.65	1.60	9.95	0.50		2.91	2.56	5.47	0.27			
	Some	6	145.27	2.35	153.20	1.67	7.93	0.48		5.51	2.80	8.31	0.50			
	Gradu	22	159.86	1.50	168.38	1.29	8.52	1.87		2.24	1.65	3.89	0.86			
	Unkno	3	122.43	2.83	131.78	1.70	9.35	0.28		7.99	2.89	10.88	0.33			
Town	Did no	1	‡	†	134.63	4.29					18.39					
	Gradu	2	134.22	3.35	141.38	2.50	7.16	0.14		11.24	6.23	17.47	0.35			
	Some	2	149.84	3.21	158.67	2.04	8.82	0.18		10.33	4.15	14.48	0.29			
	Gradu	6	152.48	2.42	157.71	1.55	5.23	0.31		5.87	2.40	8.27	0.50			
	Unkno	1	117.76	4.81	125.01	3.53	7.25	0.07		23.16	12.45	35.61	0.36			
Rural	Did no	1	134.73	3.10	137.15	3.26	2.42	0.02		9.62	10.65	20.27	0.20			
	Gradu	4	133.66	2.34	142.72	2.03	9.06	0.36		5.46	4.13	9.59	0.38			
	Some	4	148.54	2.52	152.33	1.87	3.79	0.15		6.36	3.50	9.86	0.39			
	Gradu	12	153.81	2.10	159.74	1.51	5.93	0.71		4.41	2.28	6.69	0.80			
	Unkno	2	122.13	2.92	129.50	2.47	7.37	0.15		8.51	6.12	14.63	0.29			

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Average scale scores for writing, grade 8 by used the computer to organize writing for the first writing task [W810001], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				Yes		No	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	155	(2.0)	163	(1.5)
			Black	122	(2.2)	132	(2.0)
			Hispanic	129	(1.6)	139	(1.2)
			Asian	156	(3.9)	164	(2.3)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	142	(2.5)	153	(2.1)
		Suburb	White	160	(1.8)	167	(1.6)
			Black	130	(2.3)	139	(1.7)
			Hispanic	134	(1.7)	144	(1.2)
			Asian	167	(3.9)	178	(2.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	152	(3.1)	158	(2.4)
		Town	White	151	(2.1)	155	(1.6)
			Black	‡	†	135	(5.0)
			Hispanic	129	(3.0)	142	(2.2)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	149	(3.9)
		Rural	White	150	(1.9)	156	(1.4)
			Black	132	(3.0)	135	(4.3)
			Hispanic	137	(2.4)	143	(1.5)
			Asian	‡	†	176	(3.7)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	144	(3.3)	152	(2.8)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.39	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.49	**2.70**	**0.007**
City	White	9	155.21	2.00	163.09	1.52	7.88	0.71		3.99	2.30	6.30	0.57			
	Black	5	121.84	2.21	131.84	1.97	10.00	0.50		4.89	3.86	8.75	0.44			
	Hispan	10	129.22	1.65	138.89	1.22	9.66	0.97		2.72	1.50	4.22	0.42			
	Asian	2	155.77	3.89	163.87	2.33	8.10	0.16		15.11	5.42	20.53	0.41			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	2	142.48	2.47	152.54	2.05	10.05	0.20		6.12	4.22	10.34	0.21			
Suburb	White	20	160.11	1.80	167.07	1.60	6.96	1.39		3.26	2.55	5.80	1.16			
	Black	4	130.34	2.30	138.88	1.74	8.54	0.34		5.30	3.03	8.33	0.33			
	Hispan	10	133.83	1.66	144.44	1.22	10.61	1.06		2.76	1.49	4.26	0.43			
	Asian	2	167.37	3.95	177.64	2.51	10.27	0.21		15.58	6.29	21.87	0.44			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	3	152.21	3.06	158.36	2.44	6.16	0.18		9.34	5.98	15.32	0.46			
Town	White	8	151.44	2.07	155.13	1.60	3.69	0.30		4.27	2.57	6.84	0.55			
	Black	1	‡	†	135.12	4.96					24.60					
	Hispan	2	129.26	2.99	141.89	2.22	12.63	0.25		8.96	4.92	13.88	0.28			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	‡	†	149.46	3.92					15.37					
Rural	White	15	150.50	1.88	155.73	1.40	5.24	0.79		3.54	1.95	5.49	0.82			
	Black	2	132.21	3.02	135.10	4.28	2.89	0.06		9.11	18.30	27.42	0.55			
	Hispan	3	136.71	2.41	143.32	1.53	6.61	0.20		5.83	2.33	8.16	0.24			
	Asian	0	‡	†	176.20	3.74					13.97					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	143.74	3.28	152.04	2.76	8.31	0.08		10.76	7.61	18.36	0.18			

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Average scale scores for writing, grade 8 by used the computer to organize writing for the first writing task [W810001], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				Yes		No	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	135	(3.3)	141	(2.7)
			Black	‡	†	121	(3.8)
			Hispanic	126	(2.2)	135	(1.1)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	141	(1.5)	148	(1.5)
			Black	121	(2.4)	125	(2.2)
			Hispanic	127	(1.8)	138	(1.3)
			Asian	‡	†	157	(5.8)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	135	(4.0)	144	(3.2)
		Some education after high school	White	153	(1.6)	158	(1.3)
			Black	133	(2.4)	140	(2.3)
			Hispanic	139	(2.3)	148	(1.4)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	148	(3.6)	151	(2.8)
		Graduated college	White	162	(1.0)	168	(1.0)
			Black	132	(1.5)	143	(1.7)
			Hispanic	144	(1.6)	154	(1.2)
			Asian	168	(3.1)	176	(1.8)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	155	(2.6)	161	(1.9)
		Unknown	White	127	(3.3)	134	(2.1)
			Black	107	(4.6)	119	(2.8)
			Hispanic	114	(1.9)	123	(1.3)
			Asian	†	†	152	(4.6)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	133	(4.0)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.84	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.63	2.88	0.004
Did not finish high	White	2	135.13	3.25	140.85	2.66	5.72	0.11		10.56	7.07	17.63	0.35			
	Black	1	‡	†	120.90	3.79					14.39					
	Hispan	4	126.13	2.16	135.18	1.14	9.05	0.36		4.65	1.29	5.94	0.24			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										
Graduated high sc	White	7	140.75	1.54	148.08	1.54	7.33	0.51		2.38	2.36	4.75	0.33			
	Black	2	120.91	2.36	124.75	2.20	3.84	0.08		5.59	4.85	10.44	0.21			
	Hispan	5	126.52	1.75	137.55	1.33	11.02	0.55		3.06	1.78	4.84	0.24			
	Asian	0	‡	†	157.23	5.81					33.77					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	135.37	3.98	144.42	3.20	9.05	0.09		15.85	10.25	26.10	0.26			
Some education a	White	7	153.50	1.62	157.74	1.26	4.24	0.30		2.61	1.59	4.21	0.29			
	Black	2	133.17	2.40	139.89	2.30	6.73	0.13		5.78	5.28	11.06	0.22			
	Hispan	4	139.06	2.32	147.99	1.39	8.93	0.36		5.37	1.95	7.32	0.29			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	148.48	3.61	151.05	2.82	2.57	0.03		13.05	7.98	21.03	0.21			
Graduated college	White	33	162.38	0.98	167.80	0.97	5.43	1.79		0.97	0.95	1.92	0.63			
	Black	5	131.63	1.51	142.85	1.66	11.23	0.56		2.29	2.77	5.06	0.25			
	Hispan	8	144.01	1.61	154.20	1.22	10.19	0.82		2.59	1.48	4.06	0.33			
	Asian	3	167.91	3.09	175.84	1.79	7.93	0.24		9.57	3.21	12.78	0.38			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	4	155.03	2.60	160.54	1.88	5.51	0.22		6.77	3.53	10.31	0.41			
Unknown	White	3	126.56	3.35	134.33	2.13	7.78	0.23		11.22	4.54	15.76	0.47			
	Black	1	107.12	4.64	119.28	2.77	12.16	0.12		21.50	7.65	29.15	0.29			
	Hispan	4	114.17	1.88	122.72	1.27	8.56	0.34		3.52	1.62	5.15	0.21			
	Asian	0	‡	†	151.55	4.64					21.49					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	132.82	4.03					16.21					

Appendix C.15

Organize Second Writing Task Calculations

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer: http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the second writing task [W810002], jurisdiction, year, gender [GENDER] and National School Lunch Program eligibility, 3 categories [SLUNCH3]: 2011

				Yes		No	
Jurisdiction	Year	Gender	National School Lunch Program eligibility, 3 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Eligible	121	(1.0)	128	(0.6)
			Not eligible	146	(0.9)	154	(1.0)
			Information not available	151	(3.0)	156	(2.7)
		Female	Eligible	140	(1.1)	147	(0.7)
			Not eligible	169	(1.0)	173	(0.9)
			Information not available	171	(2.7)	172	(2.9)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL	EFFECT	ERROR				VARIANC	*test*	*p*
	National School Lunch Program eligibility, 3 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	2.60	**3.84**	**0.000**
Gender								6.18							
Male	Eligible	21	120.97	0.97	127.79	0.64	6.81	1.43	0.95	0.42	1.36	0.29			
	Not eligible	27	146.06	0.95	153.68	1.02	7.63	2.06	0.90	1.03	1.93	0.52			
	Information not available	3	151.43	3.00	155.71	2.72	4.28	0.13	8.99	7.38	16.37	0.49			
Female	Eligible	21	139.80	1.09	147.08	0.69	7.28	1.53	1.19	0.47	1.66	0.35			
	Not eligible	26	168.87	0.96	172.80	0.94	3.92	1.02	0.92	0.88	1.80	0.47			
	Information not available	3	171.08	2.74	171.62	2.92	0.54	0.02	7.53	8.53	16.06	0.48			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the second writing task [W810002], jurisdiction, year, gender [GENDER] and school location, 4 categories [UTOL4]: 2011

				Yes		No	
Jurisdiction	Year	Gender	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	City	128	(1.6)	139	(1.3)
			Suburb	139	(1.5)	149	(1.4)
			Town	134	(2.6)	141	(2.0)
			Rural	135	(1.8)	142	(1.4)
		Female	City	149	(1.3)	156	(1.4)
			Suburb	160	(1.6)	167	(1.4)
			Town	155	(2.3)	161	(1.3)
			Rural	157	(2.0)	162	(1.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			**Control Group**		**Treatment Group**		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	***test statistic***	***p***
Gender	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.78	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.19	**3.42**	**0.001**
Male	City	14	128.31	1.64	139.41	1.28	11.09	1.55		2.70	1.64	4.34	0.61			
	Suburb	19	139.37	1.54	148.51	1.37	9.14	1.74		2.37	1.87	4.24	0.81			
	Town	6	133.85	2.64	140.53	2.04	6.68	0.40		6.98	4.16	11.15	0.67			
	Rural	12	135.31	1.80	142.19	1.43	6.88	0.83		3.25	2.03	5.29	0.63			
Female	City	14	148.78	1.32	155.64	1.45	6.86	0.96		1.74	2.10	3.83	0.54			
	Suburb	19	160.28	1.65	167.33	1.38	7.05	1.34		2.72	1.89	4.61	0.88			
	Town	6	155.15	2.29	161.29	1.29	6.14	0.37		5.22	1.67	6.90	0.41			
	Rural	11	156.57	1.99	162.04	1.39	5.47	0.60		3.94	1.93	5.87	0.65			

National Center for Education Statistics (NCES)

Institute of Education Sciences (IES)

National Assessment of Educational Progress (NAEP)

This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the second writing task [W810002], jurisdiction, year, gender [GENDER] and parental education level, from 2 questions [PARED]: 2011

				Yes		No	
Jurisdiction	Year	Gender	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	Did not finish high school	120	(2.5)	125	(1.3)
			Graduated high school	123	(1.7)	132	(1.2)
			Some education after high school	134	(1.7)	141	(1.0)
			Graduated college	145	(1.1)	154	(0.9)
			Unknown	113	(2.0)	118	(1.3)
		Female	Did not finish high school	135	(2.3)	144	(1.2)
			Graduated high school	143	(1.4)	150	(1.1)
			Some education after high school	157	(1.4)	162	(1.1)
			Graduated college	167	(0.9)	172	(0.9)
			Unknown	130	(2.3)	138	(1.4)

NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			**Control Group**		**Treatment Group**		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	***test statistic***	***p***
Gender	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	7.21	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.14	**4.07**	**0.000**
Male	Did no	3	120.04	2.46	125.49	1.29	5.45	0.16		6.04	1.65	7.69	0.23			
	Gradu	8	122.56	1.65	131.61	1.19	9.04	0.72		2.74	1.41	4.15	0.33			
	Some	7	134.44	1.72	140.54	1.04	6.10	0.43		2.97	1.08	4.05	0.28			
	Gradu	27	144.68	1.07	153.98	0.94	9.30	2.51		1.15	0.88	2.03	0.55			
	Unkno	5	112.85	1.99	117.85	1.28	5.00	0.25		3.97	1.63	5.60	0.28			
Female	Did no	4	135.48	2.26	144.38	1.24	8.90	0.36		5.09	1.54	6.64	0.27			
	Gradu	8	142.81	1.40	150.49	1.11	7.68	0.61		1.96	1.23	3.19	0.26			
	Some	8	157.14	1.38	162.13	1.08	4.99	0.40		1.90	1.17	3.06	0.25			
	Gradu	26	166.74	0.88	172.25	0.90	5.51	1.43		0.77	0.81	1.58	0.41			
	Unkno	4	129.73	2.31	138.03	1.41	8.31	0.33		5.34	1.98	7.31	0.29			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the second writing task [W810002], jurisdiction, year, gender [GENDER] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				Yes		No	
Jurisdiction	Year	Gender	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Male	White	145	(1.2)	151	(1.0)
			Black	120	(1.4)	126	(1.4)
			Hispanic	123	(1.4)	132	(0.8)
			Asian	151	(3.6)	161	(2.1)
			American Indian/Alaska Native	‡	†	129	(4.3)
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	137	(2.5)	143	(1.6)
		Female	White	167	(1.0)	171	(0.9)
			Black	137	(1.9)	142	(1.6)
			Hispanic	142	(1.3)	151	(0.9)
			Asian	170	(3.5)	178	(1.9)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	159	(2.2)	164	(1.7)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Gender	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.44	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.57	**3.41**	**0.001**
Male	White	26	144.66	1.24	151.37	1.02	6.71	1.74		1.53	1.04	2.58	0.67			
	Black	6	120.26	1.44	125.98	1.39	5.72	0.34		2.06	1.94	4.00	0.24			
	Hispan	13	122.82	1.41	132.24	0.82	9.42	1.23		1.98	0.67	2.64	0.34			
	Asian	2	151.08	3.63	161.42	2.14	10.34	0.21		13.17	4.56	17.74	0.35			
	Ameri	0	‡	†	129.33	4.25					18.10					
	Native	0	‡	†	‡	†										
	Two o	3	137.35	2.54	143.14	1.59	5.80	0.17		6.43	2.54	8.97	0.27			
Female	White	25	166.53	0.99	170.78	0.93	4.25	1.06		0.99	0.86	1.84	0.46			
	Black	6	136.61	1.93	142.47	1.64	5.86	0.35		3.72	2.68	6.40	0.38			
	Hispan	12	141.94	1.31	150.57	0.90	8.63	1.04		1.72	0.81	2.52	0.30			
	Asian	2	170.36	3.51	177.98	1.86	7.62	0.15		12.33	3.47	15.80	0.32			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	158.96	2.19	163.73	1.65	4.77	0.14		4.79	2.73	7.52	0.23			

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the second writing task [W810002], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and school location, 4 categories [UTOL4]: 2011

				Yes		No	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	School location, 4 categories	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	City	125	(1.2)	134	(1.0)
			Suburb	133	(1.2)	139	(1.0)
			Town	134	(2.8)	139	(1.3)
			Rural	133	(1.7)	140	(1.5)
		Not eligible	City	156	(1.6)	161	(1.4)
			Suburb	160	(1.6)	167	(1.4)
			Town	155	(2.2)	158	(1.6)
			Rural	156	(1.9)	159	(1.3)
		Information not available	City	160	(3.8)	166	(4.9)
			Suburb	163	(5.2)	165	(4.4)
			Town	‡	†	157	(4.3)
			Rural	‡	†	159	(4.9)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			**Control Group**		**Treatment Group**		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	***test statistic***	***p***
National School Lunch Program eligibility, 3 categories	School location, 4 categories	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	5.83	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.99	**2.38**	**0.017**
Eligible	City	15	125.27	1.23	133.61	1.02	8.35	1.25		1.51	1.04	2.55	0.38			
	Suburb	13	132.90	1.19	139.12	1.03	6.23	0.81		1.42	1.06	2.48	0.32			
	Town	5	134.30	2.82	139.49	1.33	5.19	0.26		7.93	1.77	9.70	0.49			
	Rural	9	133.24	1.71	139.76	1.46	6.52	0.59		2.92	2.13	5.05	0.45			
Not eligible	City	10	156.38	1.55	161.38	1.41	5.01	0.50		2.41	2.00	4.40	0.44			
	Suburb	23	160.26	1.60	167.39	1.45	7.13	1.64		2.56	2.09	4.65	1.07			
	Town	6	154.53	2.21	157.60	1.59	3.07	0.18		4.88	2.54	7.42	0.45			
	Rural	13	155.76	1.89	159.03	1.34	3.26	0.42		3.56	1.80	5.36	0.70			
Information not av	City	2	160.00	3.75	166.31	4.87	6.32	0.13		14.07	23.74	37.81	0.76			
	Suburb	2	162.65	5.20	165.02	4.43	2.37	0.05		27.04	19.65	46.69	0.93			
	Town	1	‡	†	156.70	4.35					18.92					
	Rural	1	‡	†	158.97	4.89					23.88					

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the second writing task [W810002], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and parental education level, from 2 questions [PARED]: 2011

				Yes		No	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	Did not finish high school	127	(2.0)	134	(1.0)
			Graduated high school	128	(1.4)	134	(0.8)
			Some education after high school	139	(1.6)	145	(0.9)
			Graduated college	136	(1.2)	145	(0.9)
			Unknown	115	(1.6)	123	(1.3)
		Not eligible	Did not finish high school	136	(3.6)	146	(2.4)
			Graduated high school	141	(2.0)	152	(1.6)
			Some education after high school	155	(1.8)	159	(1.4)
			Graduated college	164	(0.9)	168	(1.0)
			Unknown	133	(3.3)	138	(2.0)
		Information not available	Did not finish high school	‡	†	‡	†
			Graduated high school	‡	†	147	(5.4)
			Some education after high school	‡	†	156	(4.1)
			Graduated college	165	(2.7)	168	(2.6)
			Unknown	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	5.84	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	3.83	**2.99**	**0.003**
Eligible	Did no	6	127.39	1.99	133.71	1.02	6.32	0.38		3.98	1.04	5.02	0.30			
	Gradu	10	127.87	1.36	133.67	0.84	5.80	0.58		1.85	0.70	2.55	0.26			
	Some	8	138.74	1.61	144.98	0.95	6.25	0.50		2.59	0.89	3.49	0.28			
	Gradu	13	135.64	1.17	144.65	0.88	9.01	1.17		1.37	0.77	2.14	0.28			
	Unkno	6	114.68	1.60	122.90	1.30	8.22	0.49		2.57	1.69	4.26	0.26			
Not eligible	Did no	1	135.77	3.62	146.37	2.42	10.60	0.11		13.10	5.85	18.94	0.19			
	Gradu	6	140.92	1.98	151.69	1.64	10.77	0.65		3.91	2.69	6.60	0.40			
	Some	7	154.77	1.82	158.64	1.42	3.88	0.27		3.30	2.01	5.31	0.37			
	Gradu	36	163.50	0.93	167.67	0.97	4.17	1.50		0.87	0.94	1.81	0.65			
	Unkno	2	133.19	3.29	137.66	1.97	4.47	0.09		10.85	3.86	14.71	0.29			
Information not a	Did no	0	‡	†	‡	†										
	Gradu	0	‡	†	146.88	5.44					29.55					
	Some	1	‡	†	156.15	4.09					16.70					
	Gradu	4	165.42	2.69	168.07	2.60	2.65	0.11		7.22	6.76	13.97	0.56			
	Unkno	0	‡	†	‡	†										

National Center for Education Statistics (NCES)
Institute of Education Sciences (IES)
National Assessment of Educational Progress (NAEP)
This report was generated using the NAEP Data Explorer. http://nces.ed.gov/nationsreportcard/naepdata/

Average scale scores for writing, grade 8 by used the computer to organize writing for the second writing task [W810002], jurisdiction, year, National School Lunch Program eligibility, 3 categories [SLUNCH3] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				Yes		No	
Jurisdiction	Year	National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Eligible	White	139	(1.4)	145	(1.0)
			Black	122	(1.3)	129	(1.3)
			Hispanic	126	(1.2)	134	(0.7)
			Asian	141	(4.0)	155	(2.6)
			American Indian/Alaska Native	‡	†	127	(5.2)
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	139	(2.5)	143	(1.9)
		Not eligible	White	162	(0.9)	165	(1.0)
			Black	142	(2.1)	146	(1.7)
			Hispanic	145	(1.6)	154	(1.1)
			Asian	169	(3.4)	177	(1.8)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	158	(2.6)	162	(1.6)
		Information not available	White	166	(3.0)	167	(2.7)
			Black	‡	†	146	(4.8)
			Hispanic	151	(5.1)	156	(3.9)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
National School Lunch Program eligibility, 3 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	5.23	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	4.21	**2.55**	**0.011**
Eligible	White	13	139.29	1.42	144.68	1.04	5.39	0.70		2.01	1.09	3.10	0.40			
	Black	8	122.11	1.33	128.66	1.34	6.55	0.52		1.76	1.79	3.55	0.28			
	Hispan	16	126.18	1.17	133.99	0.67	7.81	1.25		1.38	0.45	1.83	0.29			
	Asian	1	141.42	4.02	154.70	2.63	13.28	0.13		16.12	6.94	23.06	0.23			
	Ameri	0	‡	†	126.75	5.17					26.74					
	Native	0	‡	†	‡	†										
	Two o	3	139.50	2.50	142.81	1.92	3.31	0.10		6.23	3.70	9.94	0.30			
Not eligible	White	35	161.84	0.95	165.49	1.04	3.65	1.28		0.90	1.07	1.97	0.69			
	Black	3	141.99	2.12	146.03	1.70	4.04	0.12		4.50	2.89	7.39	0.22			
	Hispan	8	144.90	1.61	154.21	1.10	9.31	0.75		2.61	1.20	3.81	0.30			
	Asian	2	168.88	3.37	177.25	1.84	8.37	0.17		11.37	3.38	14.74	0.29			
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	3	158.07	2.59	162.46	1.61	4.38	0.13		6.71	2.60	9.31	0.28			
Information not av	White	3	166.02	3.02	167.17	2.72	1.15	0.03		9.13	7.39	16.52	0.50			
	Black	0	‡	†	145.61	4.84					23.47					
	Hispan	1	151.23	5.14	155.94	3.94	4.72	0.05		26.41	15.55	41.96	0.42			
	Asian	0	‡	†	‡	†										
	Ameri	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two o	0	‡	†	‡	†										

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Average scale scores for writing, grade 8 by used the computer to organize writing for the second writing task [W810002], jurisdiction, year, school location, 4 categories [UTOL4] and parental education level, from 2 questions [PARED]: 2011

				Yes		No	
Jurisdiction	Year	School location, 4 categories	Parental education level, from 2 questions	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	Did not finish high school	124	(2.5)	133	(1.6)
			Graduated high school	127	(2.0)	136	(1.3)
			Some education after high school	142	(2.1)	147	(1.4)
			Graduated college	150	(1.5)	160	(1.4)
			Unknown	116	(2.2)	124	(1.9)
		Suburb	Did not finish high school	127	(2.7)	140	(1.7)
			Graduated high school	136	(2.0)	143	(1.5)
			Some education after high school	145	(2.2)	153	(1.6)
			Graduated college	161	(1.5)	168	(1.3)
			Unknown	125	(2.8)	131	(1.7)
		Town	Did not finish high school	‡	†	134	(4.2)
			Graduated high school	135	(3.9)	141	(2.4)
			Some education after high school	150	(4.5)	158	(1.9)
			Graduated college	153	(2.3)	157	(1.4)
			Unknown	‡	†	125	(3.4)
		Rural	Did not finish high school	137	(3.5)	137	(2.7)
			Graduated high school	132	(2.8)	143	(1.9)
			Some education after high school	148	(2.4)	152	(1.7)
			Graduated college	154	(2.2)	159	(1.5)
			Unknown	125	(3.4)	128	(2.4)

† Not applicable.
‡ Reporting standards not met.
NOTE: The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Parental education level, from 2 questions	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.72	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.28	**2.49**	**0.013**
City	Did no	3	123.88	2.55	132.52	1.63	8.63	0.26		6.50	2.65	9.15	0.27			
	Gradu	4	127.15	2.05	135.69	1.35	8.54	0.34		4.20	1.81	6.01	0.24			
	Some	4	142.31	2.14	146.59	1.44	4.29	0.17		4.59	2.08	6.67	0.27			
	Gradu	13	149.93	1.47	159.68	1.40	9.75	1.27		2.18	1.95	4.13	0.54			
	Unkno	3	116.01	2.23	123.80	1.94	7.79	0.23		4.99	3.76	8.75	0.26			
Suburb	Did no	2	127.36	2.73	140.03	1.72	12.67	0.25		7.43	2.95	10.38	0.21			
	Gradu	5	135.84	2.02	143.49	1.49	7.65	0.38		4.09	2.22	6.31	0.32			
	Some	6	145.29	2.19	152.90	1.63	7.61	0.46		4.79	2.67	7.46	0.45			
	Gradu	22	161.17	1.53	167.66	1.31	6.49	1.43		2.33	1.72	4.05	0.89			
	Unkno	3	124.80	2.78	130.66	1.71	5.86	0.18		7.72	2.94	10.66	0.32			
Town	Did no	1	‡	†	133.87	4.18					17.49					
	Gradu	2	134.74	3.91	141.18	2.41	6.44	0.13		15.27	5.82	21.09	0.42			
	Some	2	150.36	4.47	157.92	1.95	7.56	0.15		20.01	3.80	23.81	0.48			
	Gradu	6	153.35	2.27	157.19	1.39	3.84	0.23		5.16	1.92	7.08	0.42			
	Unkno	1	‡	†	124.93	3.40					11.54					
Rural	Did no	1	136.97	3.55	137.32	2.70	0.36	0.00		12.59	7.29	19.89	0.20			
	Gradu	4	132.48	2.83	142.64	1.90	10.16	0.41		8.00	3.60	11.60	0.46			
	Some	4	147.98	2.39	151.99	1.69	4.01	0.16		5.70	2.87	8.57	0.34			
	Gradu	12	154.37	2.17	159.40	1.50	5.03	0.60		4.73	2.26	6.99	0.84			
	Unkno	2	125.03	3.41	128.22	2.41	3.19	0.06		11.62	5.82	17.43	0.35			

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Average scale scores for writing, grade 8 by used the computer to organize writing for the second writing task [W810002], jurisdiction, year, school location, 4 categories [UTOL4] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				Yes		No	
Jurisdiction	Year	School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	City	White	156	(2.1)	163	(1.4)
			Black	123	(2.0)	131	(2.0)
			Hispanic	130	(1.6)	138	(1.2)
			Asian	157	(3.6)	163	(2.5)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	143	(2.2)	152	(2.3)
		Suburb	White	162	(1.7)	166	(1.6)
			Black	131	(2.5)	138	(1.7)
			Hispanic	134	(1.5)	144	(1.3)
			Asian	171	(3.6)	176	(2.6)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	153	(3.0)	158	(2.3)
		Town	White	151	(2.6)	155	(1.3)
			Black	‡	†	131	(4.8)
			Hispanic	130	(3.8)	141	(2.2)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	148	(3.9)
		Rural	White	151	(1.8)	155	(1.4)
			Black	133	(3.8)	135	(3.5)
			Hispanic	135	(2.7)	143	(1.5)
			Asian	‡	†	177	(3.4)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	145	(3.9)	151	(2.8)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
School location, 4 categories	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	6.13	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	7.60	**2.22**	**0.026**
City	White	9	155.66	2.08	162.73	1.44	7.07	0.64		4.34	2.07	6.40	0.58			
	Black	5	123.03	2.00	130.75	2.04	7.72	0.39		4.02	4.15	8.17	0.41			
	Hispan	10	129.82	1.60	138.40	1.24	8.59	0.86		2.55	1.53	4.08	0.41			
	Asian	2	156.62	3.62	163.35	2.51	6.73	0.13		13.12	6.31	19.43	0.39			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	2	142.93	2.23	151.63	2.30	8.71	0.17		4.97	5.30	10.27	0.21			
Suburb	White	20	161.64	1.75	166.34	1.61	4.71	0.94		3.05	2.60	5.65	1.13			
	Black	4	130.63	2.50	138.41	1.66	7.78	0.31		6.26	2.75	9.00	0.36			
	Hispan	10	134.43	1.47	143.70	1.34	9.27	0.93		2.17	1.80	3.97	0.40			
	Asian	2	170.64	3.63	176.27	2.56	5.63	0.11		13.18	6.58	19.76	0.40			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	3	152.71	3.00	157.76	2.31	5.05	0.15		9.02	5.33	14.35	0.43			
Town	White	8	151.34	2.55	155.06	1.33	3.71	0.30		6.51	1.78	8.29	0.66			
	Black	1	‡	†	130.79	4.85					23.49					
	Hispan	2	129.94	3.75	141.03	2.18	11.09	0.22		14.09	4.76	18.86	0.38			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	†	†	147.79	3.91					15.30					
Rural	White	15	151.18	1.84	155.39	1.40	4.21	0.63		3.40	1.96	5.36	0.80			
	Black	2	133.01	3.78	134.97	3.50	1.96	0.04		14.31	12.28	26.60	0.53			
	Hispan	3	134.95	2.75	143.24	1.51	8.30	0.25		7.54	2.27	9.80	0.29			
	Asian	0	‡	†	176.81	3.40					11.54					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	145.46	3.88	151.15	2.83	5.69	0.06		15.02	8.01	23.03	0.23			

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Average scale scores for writing, grade 8 by used the computer to organize writing for the second writing task [WB10002], jurisdiction, year, parental education level, from 2 questions [PARED] and race/ethnicity using 2011 guidelines, student-reported [DRACE10]: 2011

				Yes		No	
Jurisdiction	Year	Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Average scale score	Standard error	Average scale score	Standard error
National	2011	Did not finish high school	White	140	(3.1)	139	(2.6)
			Black	‡	†	123	(3.1)
			Hispanic	127	(2.4)	135	(1.1)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	‡	†
		Graduated high school	White	141	(1.6)	148	(1.5)
			Black	121	(2.5)	125	(2.1)
			Hispanic	127	(2.0)	137	(1.3)
			Asian	‡	†	157	(5.4)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	135	(4.5)	143	(3.3)
		ome education after high school	White	154	(1.7)	157	(1.2)
			Black	134	(2.5)	140	(2.0)
			Hispanic	139	(2.3)	147	(1.5)
			Asian	‡	†	‡	†
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	149	(3.5)	151	(2.7)
		Graduated college	White	163	(1.0)	167	(1.0)
			Black	133	(1.5)	141	(1.7)
			Hispanic	144	(1.5)	154	(1.2)
			Asian	169	(2.9)	175	(1.7)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	156	(2.6)	160	(1.8)
		Unknown	White	126	(3.6)	135	(2.0)
			Black	112	(5.1)	116	(2.8)
			Hispanic	115	(2.1)	122	(1.2)
			Asian	‡	†	150	(4.7)
			American Indian/Alaska Native	‡	†	‡	†
			Native Hawaiian/Other Pacific Islander	‡	†	‡	†
			Two or more races	‡	†	132	(4.0)

† Not applicable.
‡ Reporting standards not met.
NOTE: Black includes African American, and Hispanic includes Latino. Race categories exclude Hispanic origin. The NAEP Writing scale ranges from 0 to 300. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Writing Assessment.

Subpopulations			Control Group		Treatment Group		MODEL		EFFECT	ERROR				VARIANCE OF EFFECT	*test statistic*	*p*
Parental education level, from 2 questions	Race/ethnicity using 2011 guidelines, student-reported	Percent of sample	Average scale score LOW USE	Standard error LOW USE	Average scale score HIGH USE	Standard error HIGH USE	Difference of Means	Weighted Difference of Means	5.52	Variance of Mean LOW USE	Variance of Mean HIGH USE	Variance of Difference of Means	Weighted Variance of Difference of Means	5.78	**2.30**	**0.022**
Did not finish high	White	2	139.72	3.09	139.21	2.63	-0.51	-0.01		9.54	6.92	16.46	0.33			
	Black	1	‡	†	123.42	3.15					9.90					
	Hispan	4	126.98	2.41	134.59	1.10	7.61	0.30		5.80	1.21	7.01	0.28			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	‡	†										
Graduated high sc	White	7	141.28	1.62	147.59	1.52	6.32	0.44		2.61	2.32	4.93	0.35			
	Black	2	120.52	2.46	125.10	2.14	4.58	0.09		6.03	4.57	10.60	0.21			
	Hispan	5	126.82	2.03	136.98	1.27	10.17	0.51		4.13	1.60	5.73	0.29			
	Asian	0	‡	†	157.36	5.37					28.80					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	134.93	4.48	143.26	3.32	8.33	0.08		20.07	10.99	31.06	0.31			
Some education a	White	7	153.95	1.72	157.34	1.16	3.39	0.24		2.95	1.35	4.30	0.30			
	Black	2	133.73	2.51	139.54	1.99	5.81	0.12		6.29	3.95	10.24	0.20			
	Hispan	4	138.86	2.32	146.98	1.51	8.11	0.32		5.37	2.28	7.65	0.31			
	Asian	0	‡	†	‡	†										
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	1	149.08	3.48	150.74	2.71	1.66	0.02		12.14	7.34	19.48	0.19			
Graduated college	White	33	163.32	0.99	167.36	0.97	4.04	1.33		0.98	0.94	1.92	0.63			
	Black	5	133.45	1.46	141.02	1.67	7.57	0.38		2.13	2.78	4.91	0.25			
	Hispan	8	144.24	1.55	153.86	1.22	9.62	0.77		2.40	1.48	3.87	0.31			
	Asian	3	169.24	2.88	175.30	1.71	6.06	0.18		8.27	2.91	11.18	0.34			
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	4	156.45	2.58	159.76	1.77	3.31	0.13		6.65	3.12	9.77	0.39			
Unknown	White	3	125.60	3.64	134.57	2.02	8.97	0.27		13.26	4.07	17.33	0.52			
	Black	1	112.41	5.12	116.11	2.84	3.70	0.04		26.17	8.05	34.22	0.34			
	Hispan	4	114.66	2.05	122.30	1.21	7.64	0.31		4.21	1.47	5.67	0.23			
	Asian	0	‡	†	150.36	4.68					21.88					
	Americ	0	‡	†	‡	†										
	Native	0	‡	†	‡	†										
	Two or	0	‡	†	131.84	3.96					15.65					